*TC 3-23.30

GRENADES AND PYROTECHNIC SIGNALS

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Grenades and Pyrotechnic Signals

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Preface

TC 3-23.30 provides leaders with guidance to train subordinates on the methods of functions, description, and handling procedures of each type of hand grenade and pyrotechnic signals and simulators. Leaders should use TC 3-23.30 as a reference guide to train initial entry Soldiers and for unit sustainment training. Additional subjects include hand grenade and pyrotechnic signal capabilities, mechanical training, and the fundamentals and principles of employing hand grenades and pyrotechnics signals and simulators.

The principal audience for TC 3-23.30 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this publication.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels ensure that their Soldiers operate in accordance with the law of war and the rules of engagement. (See FM 6-27.)

TC 3-23.30 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which TC 3-23.30 is the proponent publication (the authority) are italicized in the text and are marked with an asterisk (*) in the glossary. Terms and definitions for which TC 3-23.30 is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized, and the number of the proponent publication follows the definition.

TC 3-23.30 applies to the Active Army, Army National Guard/Army National Guard of the United States and United States Army Reserve unless otherwise stated.

The proponent for TC 3-23.30 is the United States Army Training and Doctrine Command. The preparing agency is the United States Army Maneuver Center of Excellence. Send comments and recommendations on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) to Commander, Maneuver Center of Excellence, Directorate of Training and Doctrine, Doctrine and Collective Training Division, ATTN: ATZK TDD, 1 Karker Street, Fort Benning, GA 31905-5410; by email to usarmy.benning.mcoe.mbx.doctrine@mail.mil; or submit an electronic DA Form 2028.

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Chapter 1
Overview

TC 3-23.30 contains critical information and an in-depth description of each hand grenade, pyrotechnic, and simulator currently in circulation around the force. This publication educates Soldiers on fundamentals of munition functions to improve our military forces' flexible response when encountering a threat. It also provides leaders with necessary information to incorporate into their art of tactics and decision-making process.

TC 3-23.30 covers all aspects of ordnance in training and theater environments from safety procedures, characteristic layouts of each munition, employment techniques and procedures, classifications, inspections and storage, drills, and training. These chapters discuss proper employment methods and increase protection capabilities by mitigating risk and applying environmental assessments.

SAFETY OVERVIEW

1-1. Safety includes safe handling, the rules of hand grenades, and pyrotechnics safety. Each of these topics relate to training execution and tactical employment. Leaders are responsible for ensuring the accountability of their Soldiers' and overseeing the use, care, and employment of hand grenades and pyrotechnics.

1-2. To conduct ranges safely and efficiently, while simultaneously ingraining respect for munitions and their inherent role in the Army, leaders must instruct, educate, and reinforce munition safety routinely. Each Soldier must understand how to apply safe handling practices to include a comprehensive understanding of the unit's established rules of engagement (ROE), as well as the ethical employment of arms.

HAND GRENADES OVERVIEW

1-3. Hand grenades and pyrotechnics degrade detection by denying an opposing force the ability to gain and maintain observation of friendly forces. Simulators allow Soldiers to train a specific ordnance in training environments to build mastery and train subordinates on proper installation and employment methods. This increases combat lethality by incorporating weaponeering into the battlefield and allows Soldiers to assess their capabilities to determine how to eliminate or neutralize the threat.

1-4. *Ordnance* is defined as explosives, chemicals, pyrotechnics, and similar stores, e.g., bombs, guns and ammunition, flares, smoke, or napalm (JP 3-15). *Munition* is defined as a complete device charged with explosives, propellants, pyrotechnics, initiating composition or chemical, biological, radiological or nuclear material, for use in operations, including demolitions (FM 4-30). Throughout this publication, these terms will be used in context to explain characteristics, functions, and methods about each grenade or pyrotechnic.

1-5. Hand grenades play an instrumental role in increasing combat effectiveness and survivability. Each grenade offers a unique capability that provides the Soldier with various options to complete any given mission. Hand grenades can be used in all types of terrain and employed in most combat situations to—

- Eliminate the threat of enemy soldiers in the open and entrenched within fortified positions.
- Mark positions.
- Create obscuration.
- Surprise the enemy.

- Neutralize the threat.
- Destroy or disable enemy equipment.

1-6. The six types of hand grenades currently used are—

- Training practice grenades (known as TPGs). Used for training personnel in how to use, care, and handle service grenades.
- Fragmentation grenades. Historically considered the most important type of hand grenade. When used, these grenades project high-velocity fragments to produce casualties.
- Offensive grenades. Much less lethal than fragmentation grenades on an enemy in the open, but they are effective against an enemy within a confined space.
- Nonlethal grenades. Uses include diversionary purposes and nonlethal force.
- Chemical grenades. Uses include incendiary purposes, screening, signaling, training, or riot control.
- Smoke grenades. Self-contained units used by Soldiers to signal aircraft, to convey information through a prearranged signal, or to screen the movement or activities of small units.

Note. The smoke-grenade series of munitions meet both the definitions and the classification requirements for hand grenades and pyrotechnic devices.

PYROTECHNIC SIGNALS OVERVIEW

1-7. Pyrotechnics range from flares to signals to simulators. Pyrotechnic signals supplement or replace normal communication means, mark locations, chart enemy courses, and provide illumination for search and rescue missions. Each pyrotechnic signal offers a unique capability that provides the Soldier with various options to complete any given mission.

1-8. The four types of pyrotechnic signals are—

- Communication signals. Two types are handheld signals and ground smoke signals, both of which come in varied color patterns. Uses include coordinating troop movements and, in the case of an emergency, designate pick-up points.
- Surface trip flares. Uses include providing early warning of enemy troops, igniting fires, or forcing an enemy to react or withdraw.
- Simulated signals. Simulated early warning signals and simulated trip flares are used during field training exercises.
- Illumination ground signal kits. Used for distress signaling or identifying ground locations for aircraft. These signals can also be used to support the small-unit leader in fire control, maneuver, and initiating operations.

EMPLOYMENT

1-9. Hand grenades are highly versatile and effective munitions on the battlefield. Ground Soldiers employ hand grenades throughout the spectrum of warfare—from low- to high-intensity conflicts—to prevent giving away their positions, to save on ammunition, and to inflict casualties.

1-10. Before employing hand grenades or pyrotechnic signals, Soldiers should understand where they intend to use the munition and follow the employment rules. The following rules allow Soldiers to develop their situational awareness by considering their environment when and where they use munitions:

- Inspect all grenades and pyrotechnics signals for serviceability before use.
- Know where all friendly forces are located.
- Know the sector of fire.
- Ensure the projected arc of the grenade or pyrotechnic signal is clear of obstacles.

Chapter 2
Safety

This chapter discusses safety considerations for grenades, pyrotechnics, and simulators, including safe handling procedures and safety measures for employing munitions. The guidelines outlined in this chapter enhance Soldier confidence in using and maintaining various munitions and ordinances in training and operational environments.

SAFE HANDLING

2-1. Safe hand grenades and pyrotechnics handling procedures are a consistent and standardized way for Soldiers to handle, operate, and employ the device safely and effectively. Hand grenades and pyrotechnics handling are structured on three components—the Soldier, the device, and the environment:

- The Soldier must maintain situational understanding of friendly forces, the status of the device, and be able to evaluate the environment to properly handle any device. Smart, adaptive, and disciplined Soldiers are the primary safety mechanism for all hand grenades and pyrotechnics under their control.
- The device is the Soldier's situational tool to defeat threats in combat. Soldiers must understand and know how to operate the mechanical safeties built into the devices they employ, as well as the principles of operation for those devices.
- The environment is the Soldier's surroundings. The Soldier must be aware of the lethal radius, blast radius, and fire hazard of the devices being used, as well as the nature of what is in front of and behind the intended target.

SAFETY MEASURES

2-2. To handle hand grenades and pyrotechnics safely and effectively, Soldiers must be cognitively aware of the rules of hand grenade and pyrotechnics safety. These rules provide the safest method of utilizing safety measures.

2-3. These measures directly support the components of safe weapons handling. Their design provides redundant safety measures when handling any hand grenade or pyrotechnic device.

Note. Unit standard operating procedures (SOPs), range SOPs, or the operational environment may dictate additional safety protocols; however, the rules of hand grenade and pyrotechnic safety are always applied. If a unit training plan questions the safety protocols for any reason, such as for the use of training devices during training, the unit commander must take appropriate risk mitigation actions.

2-4. There are standardized rules of hand grenade and pyrotechnics safety for any device a Soldier may employ. Soldiers must adhere to these precepts during training and combat operations, regardless of the type of device, except as noted above.

RULE 1: ENSURE SOLDIERS ARE EQUIPPED WITH PERSONAL PROTECTIVE EQUIPMENT

2-5. Before employing hand grenades and pyrotechnics, proper protective measures must be in place to ensure Soldiers' safety while throwing or employing the munition. Using standard-issued body armor and single and double hearing protection adds to the safety of the Soldier. Leaders help mitigate safety risks by ensuring all Soldiers wear the appropriate personal protective equipment (PPE).

2-6. PPE, at a minimum, must consist of the Soldier's issued helmet, gloves, ear protection, approved eye protection, and body armor (interceptor body armor, improved outer tactical vest, plate carrier) with small arms protective insert) plates. See the program executive officer for the list of current eyewear and protective equipment.

2-7. Double hearing protection is required when employing indoors and confined spaces. Some grenades have a decibel index that requires using double hearing protection because of the blast and sound. Leaders must consider this safety issue and ensure appropriate protocols are accounted for before employment.

RULE 2: ENSURE POSITIVE IDENTIFICATION OF THE INTENDED TARGET AREA AND ITS SURROUNDINGS

2-8. The disciplined Soldier can positively identify the target and identifies what is in front of and what is beyond it. The Soldier is responsible for knowing the capabilities (for example, lethal radius, bursting radius, elevation height, and fire hazard for each type of device employed). The Soldier is responsible for handling the device, including its final destination.

2-9. Application of this rule minimizes the possibility of fratricide, collateral damage, or damage to infrastructure or equipment. It also prepares the Soldier for any follow-on employments of hand grenades and pyrotechnics.

RULE 3: KEEP GRENADE STOWED UNTIL READY TO EMPLOY

2-10. The Soldier should stow hand grenades and pyrotechnics in designated pouches. If a designed pouch is not available, remove the device from its individual fiber canister or hermetically sealed can, inspect the device, and return it to the canister in the approved stowage method.

2-11. Soldiers visually inspect the status of their devices to ensure the grenades are safe, and they were not damaged during movement. Visual inspections will be conducted in accordance with STP 21-1 SMCT, task 071-COM-4401 (Perform Safety Checks on Hand Grenades), and TM 9-1330-200-34.

RULE 4: ARM DEVICE ONLY WHEN READY TO EMPLOY

2-12. During training and combat operations, the Soldier may be required to employ various types of devices. Examples include lethal, smoke star cluster, parachute, and signaling devices.

2-13. Before you select the device, ensure Soldiers adhere to specific safety procedures. When handling each device, Soldiers must secure the proper grip, ensure the capability is required, remove mechanical safeties, alert friendly troops, and ensure flight path is clear before employment, as described in the training strategy.

2-14. These safety measures directly support the components of safe weapons handling. Their design provides redundant safety measures when handling any hand grenade or pyrotechnic device.

Chapter 3
Hand Grenades

Chapter 3 discusses the purpose, characteristics, and proper employment of each type of hand grenade (see figure 3-1 on pages 3-1 and 3-2). Hand grenades are handheld, hand-armed, and hand-thrown munitions that supplement small arms usage against an enemy in close combat. These munitions can temporarily confuse and disorient personnel in lethal and nonlethal operations. Specific hand grenades are used to create obscuration or to identify a predetermined location for air-to-ground assets. Because hand grenades are hand-thrown, the range is short, and the casualty radius is small. Proper control and safety procedures allow for safe employment of hand grenades.

Training Grenades						
Model	***Standing***	***Kneeling***	***Alt. Prone***	***Lethal/Kill***	***Casualty Producing***	***Fragmentation***
M69 TPG	35 meters	25 meters	20 meters	N/A	N/A	5 meters
M112 POHG	35 meters	25 meters	20 meters	N/A	N/A	5 meters
M102	35 meters	25 meters	20 meters	N/A	N/A	5 meters
Fragmentation Grenades						
Model	***Standing***	***Kneeling***	***Alt. Prone***	***Lethal/Kill***	***Casualty Producing***	***Fragmentation***
M67 FRAG	35 meters	25 meters	20 meters	5 meters	15 meters	35–230 meters
Offensive Grenades						
Model	***Standing***	***Kneeling***	***Alt. Prone***	***Lethal/Kill***	***Casualty Producing***	***Fragmentation***
MK3A2	35 meters	25 meters	20 meters	2 meters	N/A	35–200 meters
M111 OHG	35 meters	25 meters	20 meters	2 meters	N/A	35–200 meters
Nonlethal Grenades						
Model	***Standing***	***Kneeling***	***Alt. Prone***	***Incapacitate***	***Disorient***	***Fragmentation***
M84 Stun	35 meters	25 meters	20 meters	1.5 meters	9 meters	N/A
M104	35 meters	25 meters	20 meters	N/A	7 meters	77 meters
Chemical Grenades						
Model	***Standing***	***Kneeling***	***Alt. Prone***	***Destructive area***		
AN-M14 TH3	25 meters	N/A	N/A	0.5 meters ***Note***: The grenade is placed and not thrown. The minimum safe distance is 25 meters.		
Legend: Alt – alternate, FRAG – fragmentation, N/A – not applicable, OHG – offensive hand grenade, POHG – practice offensive hand grenade, TH3 – thermate, TPG – training practice grenade						

Figure 3-1. Hand grenade information list

Chemical Grenades							
Model	**Standing**	**Kneeling**	**Alt. Prone**	**Incapacitate**	**Disorient**	**Fragmentation**	**Duration**
M7A2 & M7A3	35 meters	N/A	N/A	5 meters	N/A	N/A	15–35 seconds
ABC-M25A2	35 meters	25 meters	20 meters	5 meters	N/A	25 meters	15–30 seconds
M47 CS	35 meters	25 meters	20 meters	150 meters	N/A	N/A	5–25 seconds
Smoke Grenades							
Model	**Standing**	**Kneeling**	**Alt. Prone**	**Vertical Range**	**Horizontal Range**	**Duration**	
M18 red	35 meters	25 meters	20 meters	1,500 meters	3 meters	70–90 seconds	
MK16 yellow	35 meters	25 meters	20 meters	1,500 meters	3 meters	50–70 seconds	
MK17 green	35 meters	25 meters	20 meters	1,500 meters	3 meters	50–70 seconds	
MK19 white	35 meters	25 meters	20 meters	1,500 meters	3 meters	50–70 seconds	
AN-M8 HC	35 meters	25 meters	20 meters	N/A	3 meters	105–150 seconds	
M83 TA	35 meters	25 meters	20 meters	1,200 meters	1.5 meters	70–90 seconds	
M106 SOD-Vr	35 meters	25 meters	N/A	15 meters	15 meters	35 seconds	
Legend: Alt – alternate, CS – tear gas, HC – hexachloroethane-zinc, N/A – not applicable, SOD-Vr – screening obscuration device – visual restricted terrain, TA – terephthalic acid							

Figure 3-1. Hand grenade information list (continued)

TRAINING PRACTICE GRENADES

3-1. TPGs simulate the effects of hand grenades used in combat. Using TPGs reduces the chance of personnel injuries or property damage when conducting training. TPGs and training practice fuzes (known as TPFs) help to train personnel in the fundamentals of inspecting, stowing, gripping, arming, and employing fragmentation and offensive hand grenades. (See figures 3-2 through 3-9, pages 3-4 through 3-13.)

3-2. TPGs also provide realistic characteristics and familiarize Soldiers with the proper functioning of each grenade. The M69 TPG, the M112 practice offensive hand grenade (known as POHG), and the M102 stun TPG reinforce realistic training for all individual and collective training tasks.

TRAINING FUZES

3-3. The M228 and M240 TPFs are pyrotechnic delay-igniting components used for audible and visual effects in a training environment. The M228 body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, blue safety lever with brown tip at the end of the safety lever, safety clip, pull ring with safety pin seated in confidence clip (if present), and igniter assembly, and has a 4.0- to 5.5-second fuze delay. (Older M228 fuze models do not have the safety clip.) The M240 TPF is a modified M201A1 pyrotechnic delay-igniting fuze. The fuze body contains a primer, first-fire mixture, and pyrotechnic delay column and ignition mixture. Assembled to the body are a striker, striker spring, blue safety lever with a brown band at the tip end, primary safety pin with circular pull ring, and secondary safety pin with triangular pull ring and a fuze delay of 1.0 to 2.3 seconds. The M228 TPF and M240 TPF split end of the safety pin will be in an angular spread or a diamond crimp.

3-4. The M228 TPF body contains a primer and a pyrotechnic delay column, to support a 4.0- to 5.5-second fuze delay, where the non-lethal M240 TPF body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture, to support a 1.0- to 2.3-second fuze delay.

3-5. The M228 TPF is a pyrotechnic delay-igniting fuze. The body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, blue safety lever with a brown tip at the end of the safety lever, safety clip, pull ring with safety pin seated in confidence clip (if present), and igniter assembly, and has a 4.0- to 5.5-seconds fuze delay. The split end of the safety pin has an angular spread or diamond crimp. Hand grenades produced before 2007 are not fitted with the confidence clip. Hand grenade safety clips produced before 1970 may differ from the standard safety clip fitted on the M213 pyrotechnic hand grenade fuze. Grenades produced earlier than 1970 may not have a safety clip when issued. (For additional hand grenade components and characteristics information, see TM 43-0001-29.)

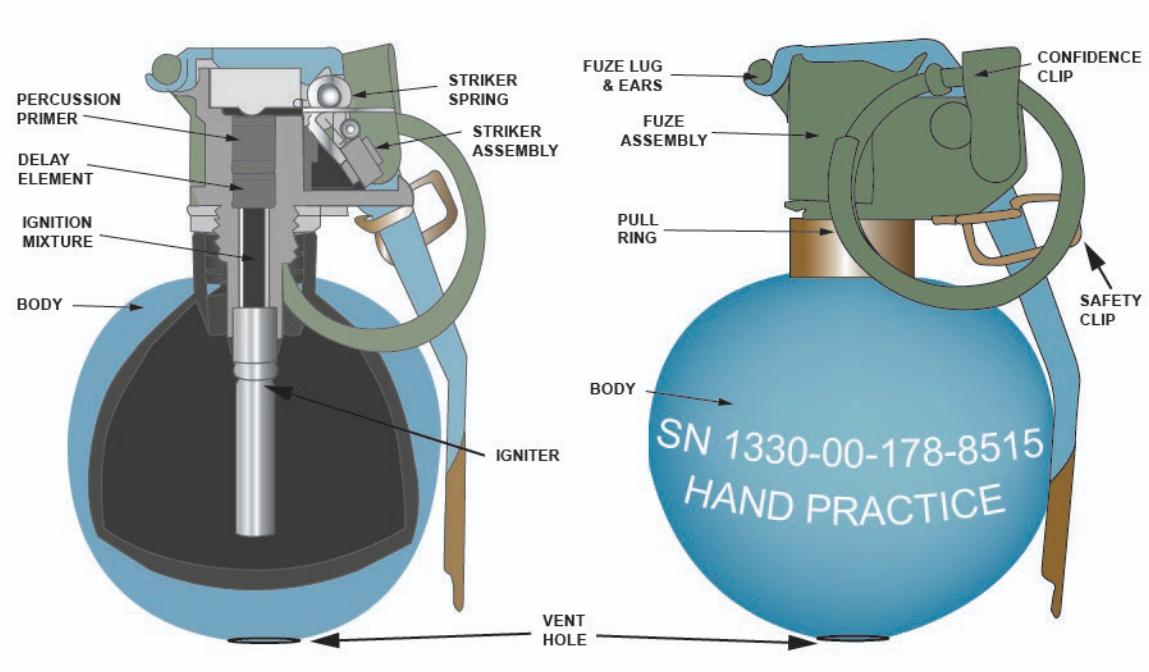
3-6. The M240 TPF body is a pyrotechnic delay-igniting fuze. The fuze body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, blue safety lever with a brown band at the tip end, primary safety pin with circular pull ring, and secondary pin with triangular pull pin. The split end of the safety pins has an angular spread. The time delay of the M240 fuze is 1.0 to 2.3 seconds. (See TM 43-0001-29.)

3-7. During practice events and for qualifications, Soldiers must understand the proper steps for installing and replacing a used fuze. Instructions must be given to the Soldier prior to training.

WARNING

Practice grenades do not have an explosive blast radius, but fragments may exit the hole in the base of the grenade body and cause injuries.

DODIC G811 w/G878	*M69 Training Practice Grenade*
The M69 TPG provides realistic training with no explosive filler and familiarizes Soldiers with the functioning and characteristics of the M67 fragmentation hand grenade. It is recommended the M69 TPG is used with the M228 TPF to reinforce the proper grip and arming procedure. TPGs employed without a fuze can damage the fuze neck and fuze well, preventing future fuze use, therefore making the TPG unserviceable.	



Note. Older versions of the M228 practice fuze are not equipped with confidence clips.

Functioning (M228 Fuze)
Releasing the safety clip, disengaging the pull ring from the confidence clip (if equipped), and removing the safety pin permits the release of the safety lever. When the grenade is thrown, the striker assembly, through action of the spring, throws off the safety lever and impacts the percussion primer that activates the primer charge. The primer charge ignites the delay composition, which will burn approximately 4.0 to 5.5 seconds. Upon completion of burning, the delay composition sets off the igniter.

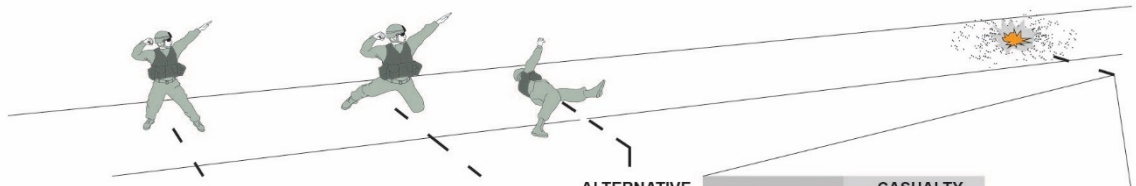
Components and Characteristics	*Details*
Nomenclature	Body, Hand Grenade Practice M69
NSN	1330-00-178-8515
Body/Colors and Markings	Hollow steel sphere / light blue body with white markings
Total Weight	13.4-ounce M69 TPG, with 2.6-ounce M228 TPF for total weight of 16.0 ounces with confidence clip
Filler	None
Fuze and Delay	M228 TPF – 4.0 to 5.5 seconds
Safety Features	• Confidence clip. • Safety clip. • Pull ring w/ safety pin. • Safety lever.

Legend: DODIC – Department of Defense identification code, NSN – national stock number, TPF – training practice fuze, TPG – training practice grenade

Figure 3-2. M69 training practice grenade

M69 – DODIC G811 w/G878	*M69 Average Throwing Distance and Explosive Radius*

Training Grenades



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	LETHAL/ KILL	CASUALTY PRODUCING	FRAGMENTATION
M69 TPG	35M	25M	20M	N/A	N/A	5M
M112 POHG	35M	25M	20M	N/A	N/A	5M
M102	35M	25M	20M	N/A	N/A	5M

NOTE: THIS EXPLOSIVE RADIUS BY ZONE REPLICATES THE BLAST RADIUS FOR THE M67 FRAGMENTATION GRENADE.

Employment

1. Select the appropriate hand grenade based on type of target.
   - The M69 is a practice grenade meant to replicate the M67 in a training environment and designed to train Soldiers how to properly arm and employ munitions.
   - Complete initial and sustainment training before conducting an LFX to ensure the Soldier can perform proper throwing positions and technics and demonstrate proficiency.
2. Select proper throwing position.
   - Ensure you have a proper covered position.
   - Determine the distance to the target.
   - Align your body with the target.
3. Grip the hand grenade.
   - Place the hand grenade in the palm of the throwing hand.
   - Place the safety lever between the first and second joints of the thumb of the throwing hand.
   - The thrower's grip must remain constant.

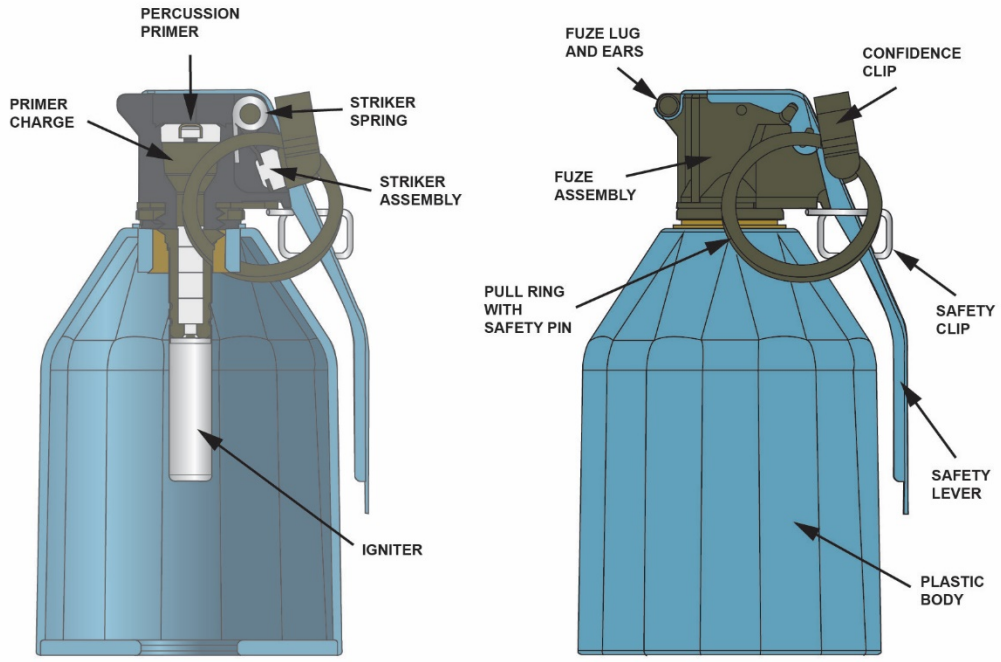
Note. For left-handed throwers, the grenade is inverted with the top of the fuze facing downwards in the throwing hand.

4. Prepare the hand grenade.
   - Remove the safety clip with your thumb from the nonthrowing hand.
   - Securing a proper right- or left-hand grip, remove the pull ring. On grenades equipped with a confidence clip, rotate the pull ring toward the body (right-handed) or away from the body (left-handed) to disengage the pull ring from the confidence clip or remove the pull ring with safety pin from the grenade, and assume the throwing position that best supports employing the grenade for distance and accuracy. Throw within the effective range of the target.
   - Confirm the distance to the target area.
   - Announce FRAG OUT.
   - Throw the grenade, landing on or near the target.
   - Seek cover to avoid fragmentation or direct enemy fire.
   - If time permits, assess the effects of the munition.

Legend: DODIC – Department of Defense identification code, LFX – live-fire exercise, M – meters, N/A – not applicable, POHG – practice offensive hand grenade, TPG – training practice grenade

Figure 3-3. M69 average throwing distance and explosive radius

DODIC G38 w/G878	*M112 Practice Offensive Hand Grenade*
The M112 POHG is for all individual and collective training tasks. The M112 POHG provides realistic training and familiarizes the Soldier with the functioning and characteristics of the M111 offensive hand grenade. It is recommended that the units use the M112 POHG with the M228 TPF for additional and reinforcement training.	

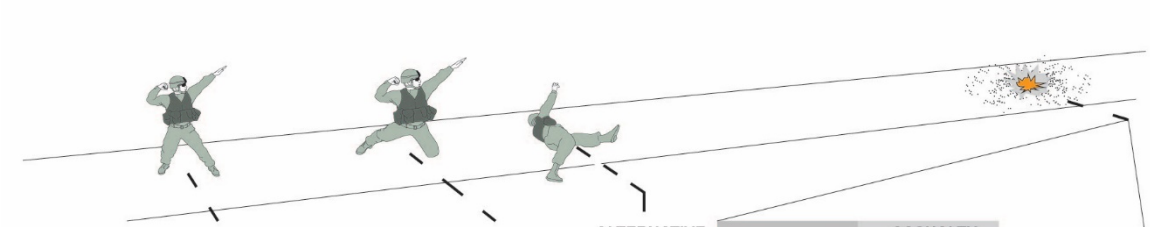


Functioning (M228 Fuze)	
Releasing the safety clip, disengaging the pull ring from the confidence clip (if equipped), and removing the safety pin permit release of the safety lever. When the grenade is thrown, the striker assembly, through action of the spring, throws off the safety lever and impacts the percussion primer that activates the primer charge. The primer charge ignites the delay composition, which will burn approximately 4.0 to 5.5 seconds. Upon completion of burning, the delay composition sets off the igniter for a high order detonation.	
Components and Characteristics	***Details***
Nomenclature	Grenade, Hand Offensive, Practice, M112
NSN	1330-01-651-4358
Body/Colors and Markings	Steel octagonal shape / light blue body with vertical white marking
Total Weight	10.0-ounce M112 POHG, with 2.6-ounce M228 TPG for total weight of 12.6 ounces with confidence clip
Filler	none
Fuze and Delay	M228 TPF - 4.0 to 5.5 seconds
Safety Features	• Confidence clip. • Safety clip. • Pull ring w/ safety pin. • Safety lever.
Legend: DODIC – Department of Defense identification code, NSN – national stock number, POHG – practice offensive hand grenade, TPF – training practice fuze, TPG – training practice grenade, W – with, W/O – without	

Figure 3-4. M112 practice offensive hand grenade

M112 – DODIC GG38 w/G878	*Average Throwing Distance and Explosive Radius*

Training Grenades



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	LETHAL/ KILL	CASUALTY PRODUCING	FRAGMENTATION
M69 TPG	35M	25M	20M	N/A	N/A	5M
M112 POHG	35M	25M	20M	N/A	N/A	5M
M102	35M	25M	20M	N/A	N/A	5M

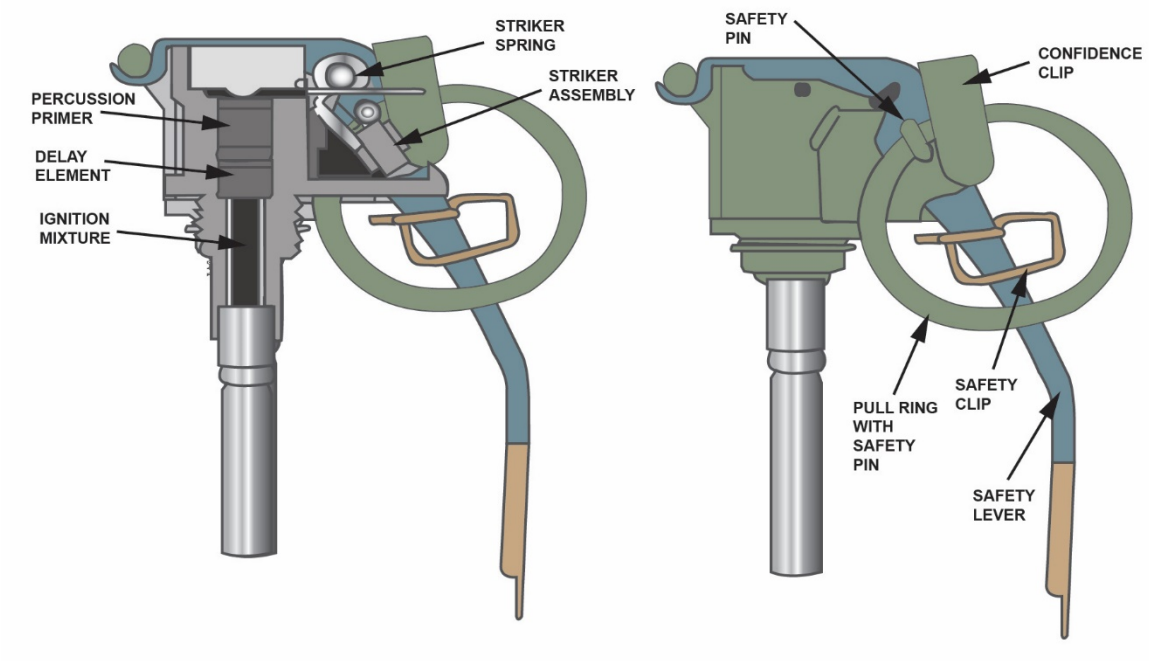
Employment

1. Employment considerations.
   - The M112 is meant to replicate the same effects and familiarize Soldiers with the components and characteristics of the M111 offensive hand grenade.
   - The purpose of the M112 is to train Soldiers on how to properly arm and employ the munition, with the use of the M228 fuze to simulate the visual and audible sounds of the M111.
   - It is not recommended to use the M112 POHG without the M228 TPF, due to Soldiers lacking the ability to perform the proper grip and the arming procedure. Without the TPF inserted on the TPG, there is a high potential of damage to the grenade fuze well and neck. Training without the M228 TPF limits the opportunity to provide realistic effects.
   - The M112 can reinforce confidence in Soldiers ability to engage targets by lobbing the grenade through open windows, mouse holes, and confined structures.
   - In the urban environment, the M112 can be used to train the Soldiers on how to employ the grenade in rooms and confined space to provide the element of surprise.
   - Entrances to underground passageways allow the M112 practice offensive hand grenade to maximize its effectiveness in close, confined spaces.
   - Suspected or likely enemy positions on stairwells, provides an advantage by suppressing the enemy with a special-purpose grenade. Soldiers should evaluate the area for possible rollback prior to use.
   - The employment technique of lobbing hand grenades underhanded or overhanded can be a desirable employment method in the confined and urban environment.
2. Safety considerations.
   - The M112 is fitted with a confidence clip; therefore, confidence clip training is required before training and employment.
   - All personnel employing the M112 should be wearing the appropriate protective equipment in accordance with unit SOP.
   - The rules of hand grenade safety should be addressed before conducting training.
   - Units should ensure reinforcement training at a minimum should involve fuze delay time, and the importance of cover when employment of the M112 and M111.

Legend: DODIC – Department of Defense identification code, M – meters, N/A – not applicable, POHG – practice offensive hand grenade, SOP – standard operating procedure, TPF – training practice fuze, TPG – training practice grenade

Figure 3-5. M112 average throwing distance and explosive radius

DODIC G878	*M228 Training Practice Fuze*
During practice events and for certification, each Soldier must throw several M69 TPGs, each armed with the M228 TPF. Although it takes only about a minute or less to install or replace a used fuze, a company-size element uses several hundred fuzes. (Instructions on installing and removing M228 fuzes can be found in figures 3-10 and 3-11, pages 3-14 and 3-15.)	



Functioning
Releasing the safety clip disengaging the pull ring from the confidence clip (if equipped) and removing the safety pin permits the release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4.0 to 5.5 seconds, and then sets off the igniter. A loud firecracker like sound with a puff of white smoke follows.

Components and Characteristics	*Details*
Nomenclature	Fuze, Hand Grenade Practice M228
NSN	W/O CC: 1330-00-168-5502 / W/CC: 1330-01-576-4241
Body/Colors and Markings	Zinc with steel safety lever / blue safety lever with brown fuze neck
Total Weight	2.6 ounces
Filler	Black powder
Fuze and Delay	M228 – 4.0 to 5.5 seconds
Legend: CC – confidence clip, DODIC – Department of Defense identification code, NSN – national stock number, TPF – training practice fuze, TPG – training practice grenade, W – with, W/O – without	

Figure 3-6. M228 training practice fuze

WARNING

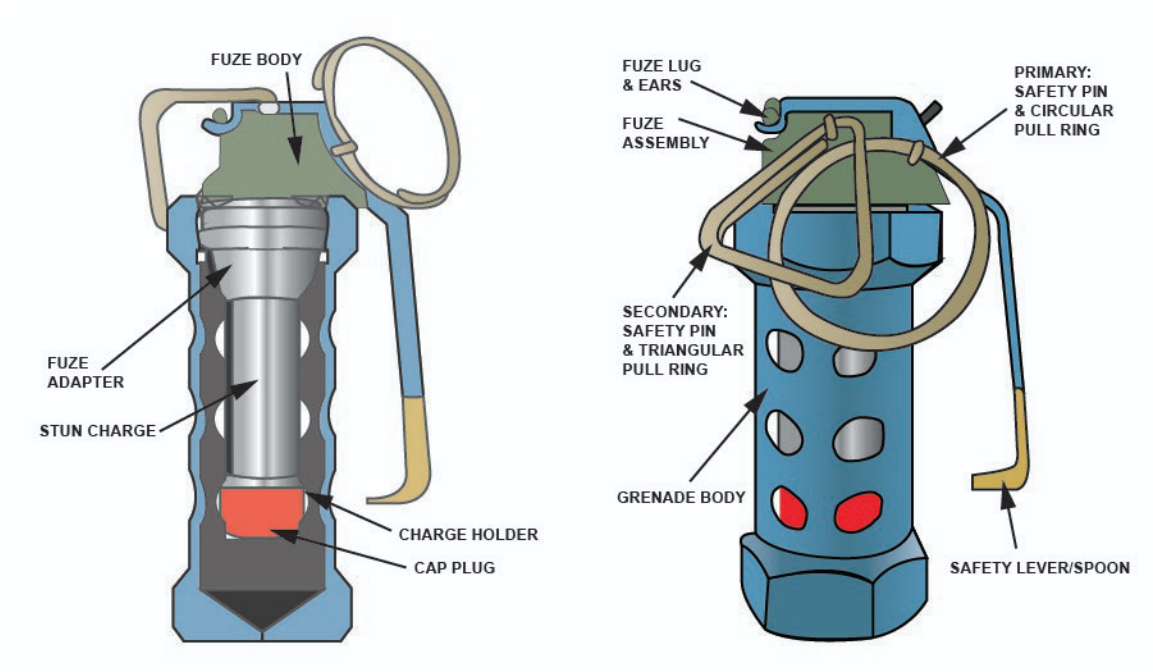
M112 POHG with M228 TPF

1. No Soldier will employ more than 300 TPGs with TPFs within a 24-hour period in the open training environment.

2. Single-hearing protection is required when employing this TPG with TPF.

3. Soldiers will wear gloves when fuzing and defuzing hand grenades.

DODIC GG17	*M102 Reloadable Stun Practice Hand Grenade*
The M102 is a cost-effective, reloadable trainer with no explosive filler. It offers realistic training to familiarize Soldiers with the functioning and characteristics of the M84 nonlethal stun grenade. It is not recommended for units to use the M102 without the M240 fuze for reinforcement training, due to Soldiers lacking the ability to perform the proper grip and the arming procedure. Without the TPF inserted on the TPG, there is a high potential of damage to the grenade fuze well and neck. Training without the M240 TPF limits the opportunity to provide realistic effects.	



Functioning
The M102 RSPHG is functioned by first removing the secondary safety pin assembly, then the primary safety pin assembly, and then by releasing the safety lever, which allows the spring-loaded striker to hit the primer igniting the primer. After releasing the safety lever, there is a delay of 1.0 to 2.3 seconds before initiation of the stun charge, which produces the flash and sound report.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Practice Nonlethal M102
NSN	1330-01-518-8785
Body/Colors and Markings	Steel hexagon tube with 18 blast and flash release holes along the sides with a heavy steel hexagon shaped top and bottom / light blue with white markings
Total Weight	14.3 ounces (19.0 ounces with M240 pyrotechnic fuze)
Filler	None
Fuze and Delay	M240 – 1.0 to 2.3 seconds
Safety Features	• Secondary safety pin and triangular pull ring. • Primary safety pin and circular pull ring. • Safety lever.

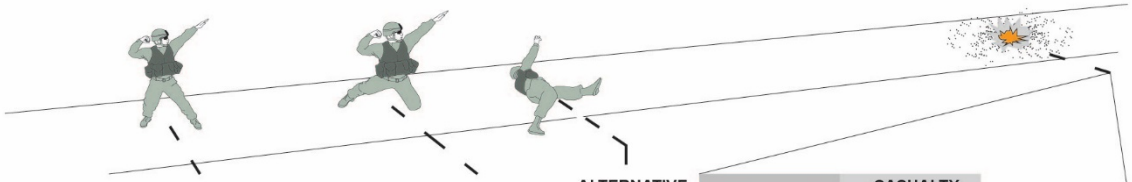
Legend: DODIC – Department of Defense identification code, NSN – national stock number, RSPHG – reloadable stun practice hand grenade, TPF – training practice fuze, TPG – training practice grenade

Figure 3-7. M102 reloadable stun practice hand grenade

M102 – DODIC GG18 w/G878	*Average Throwing Distance and Explosive Radius*

Training Grenades

NOTE: PRACTICE STUN GRENADE DOES NOT HAVE AN EXPLOSIVE BLAST RADIUS, BUT FRAGMENTS MAY EXIT THE TRAINING BODY.



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	LETHAL/ KILL	CASUALTY PRODUCING	FRAGMENTATION
M69 TPG	35M	25M	20M	N/A	N/A	5M
M112 POHG	35M	25M	20M	N/A	N/A	5M
M102	35M	25M	20M	N/A	N/A	5M

Employment

1. Select the appropriate hand grenade based on type of target.
   - The M102 is a practice grenade meant to replicate the M84 in a training environment and designed to train Soldiers how to properly arm and employ munitions.
   - To maximize realistic training, the M102 is used for diversionary purposes to train anti-terrorism squads, hostage rescue squads, and riot control squads.
2. Select proper throwing position.
   - Ensure you have a proper covered position.
   - Determine the distance to the target.
   - Align your body with the target.
3. Grip the hand grenade.
   - Place the hand grenade in the palm of the throwing hand with the safety lever placed between the first and second joints of the thumb of the throwing hand, and wrap the remaining fingers around the grenade, securing a firm grip.

Note. For left-handed throwers, the grenade is inverted with the top of the fuze facing downwards in the throwing hand.

4. Prepare the hand grenade.
   - Remove the secondary safety pin (triangle pull pin) with the nonthrowing hand.
   - Firmly holding on to the safety lever, remove the primary safety pin (circular pull ring).
5. Throw within the effective range of the target.
   - Confirm the distance to the target area, or aperture is open and clear. If the aperture is blocked, do not attempt to emplace the grenade into the opening, emplace the grenade to the front, if possible, for limited effects.
   - Employ or emplace the grenade to the intended target, having the grenade land near or in the target area.
   - Seek cover to avoid fragmentation or direct enemy fire.
   - If time permits, assess the effects of the munition.

WARNING: DO NOT attempt to "cook off" or "milk" the grenade.

WARNING: This grenade has a 1.0- to 2.3-second fuze delay. Cooking off or milking the safety lever before employment may lead to severe injury or death.

Legend: DODIC – Department of Defense identification code, M – meters, N/A – not applicable, POHG – practice offensive hand grenade, TPG – training practice grenade

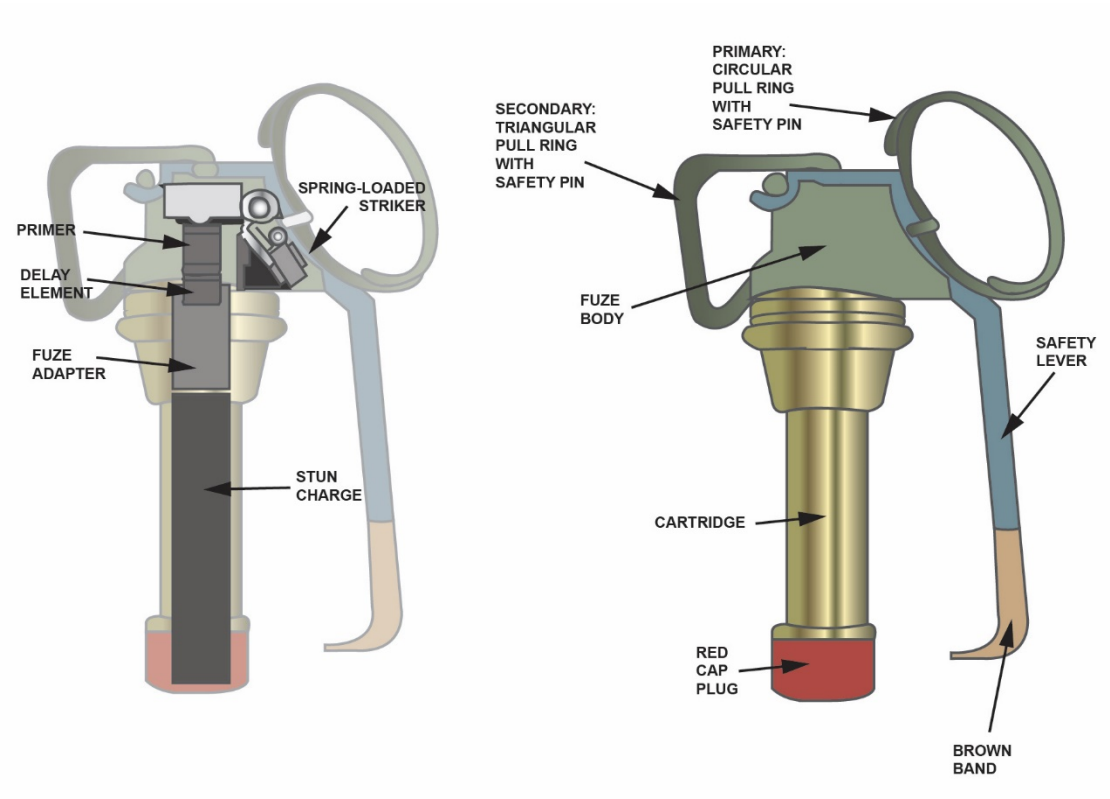
Figure 3-8. M102 average throwing distance and explosive radius

WARNING

Do not "cook off" this grenade. Do not attempt to retrieve a dropped grenade or a grenade that failed to go into an aperture.

Fuze fragments may exit any of the 18 blast and flash release holes of the grenade body and cause injuries.

DODIC GG19	*M240 Pyrotechnic Training Practice Fuze*
The M240 pyrotechnic training fuze is a charge assembly cartridge, containing the stun charge. It is a stand-alone sealed assembly held together with epoxy material at the charge holder joint, between the plug and the metal fuze adapter. The modified M201A1 fuze is also sealed with epoxy at its thread location with the fuze adapter.	



Functioning	
Remove the secondary safety pin assembly, and then the primary safety pin assembly. Releasing the safety lever allows the spring-loaded striker to hit the primer igniting the primer. After releasing the safety lever, there is a delay of 1 to 2.3 seconds before the stun charge initiates and produces the flash and sound report.	
Components and Characteristics	***Details***
Nomenclature	Hand Grenade Practice Fuze, Nonlethal M240
NSN	1330-01-518-8781
Body/Colors and Markings	3.87 inches in length, / light blue with a brown fuze head and red end cap
Total Weight	5.0 ounces
Filler	Pyrotechnic charge system
Fuze and Delay	M240 – 1.0 to 2.3 seconds
Safety Features	• Secondary safety pin and triangular pull ring. • Primary safety pin and circular pull ring. • Safety lever.
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 3-9. M240 pyrotechnic fuze (training)

INSTALLING M228 AND M240 FUZES

3-8. To install the M228 TPF in the M69 TPG or M112 TPG—

- Grip the TPG body with the nonthrowing hand, taking care to keep any part of the hand away from the firing port (nonthreaded end) of the grenade (see figure 3-10). While holding the body of the TPG, turn the grenade so the threaded end faces inward, and the firing port of the grenade faces away from your body.
- Grip the M228 TPG fuze body with the index finger and thumb of the throwing hand and insert the stem into the threaded end of the TPG and turn the grenade body counterclockwise until the fuze is secure.

CAUTION

If the fuze or fuze stem cannot be seated into the TPG, the grenade must be cleaned of fuze stem debris before use.

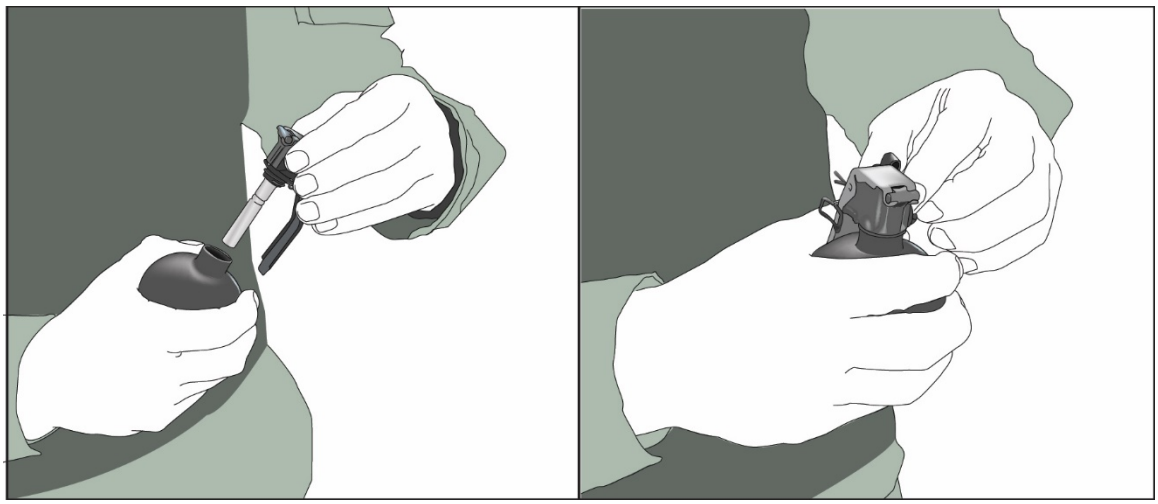


Figure 3-10. Insert the M228 TPF into the M69 TPG body

3-9. To install the M240 TPF in the M102 stun TPG—

- Prior to training, give Soldiers instructions on installing and removing a fired M240 TPF (see figure 3-11).
- Procedures for installing and removing the M240 TPF are the same as those used for the M228 TPF. For more information about these procedures, see the M228 TPF steps.

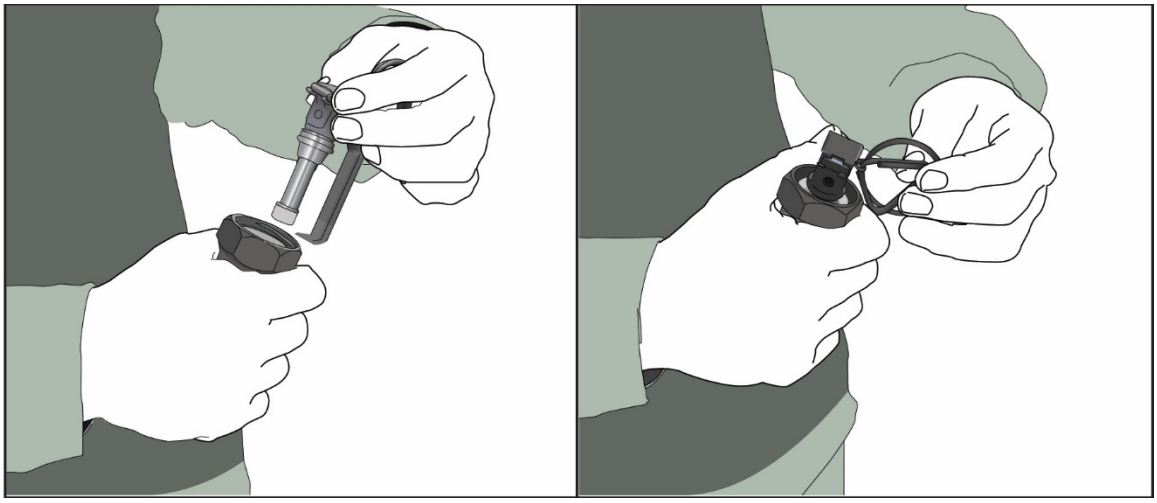


Figure 3-11. Insert the M240 TPF into the M102 body

Note. Images may show individual actions without the use of gloves for identification and ease of understanding function steps. Units should make their determination based on unit proficiency and risk management.

REMOVING M228 AND M240 FUZES

3-10. To remove a fired M228 TPF from the M69 TPG or M112 TPG—

- Grip the TPG body with the nonthrowing hand, taking care to keep any part of the hand away from the firing port (nonthreaded end) of the grenade.
- While holding the M69 TPG body, turn the grenade so that the head of the fuze faces inward and the firing port of the grenade faces away from your body.
- Grip the fuze body of the M228 TPF with the gloved fingers of the throwing hand.
- Turn the M228 TPF counterclockwise or grenade body clockwise until the fuze comes out.
- Dispose of the fuze according to the installation SOP.

3-11. To remove a fired M240 fuze in the M102 TPG—

- After the M102 TPG has functioned, wait 5 minutes for the body to cool before conducting reloading procedures on the M240 fuze.
  - The M102 grenade can be used up to 25 times by replacing the M240 pyrotechnic TPF.
  - After each use, inspect the grenade body for cracks; ensure the M240 fuze seats properly.
  - After inspecting the grenade, remove a numerical sticker located on the bottom of the grenades, and refuze the TPG.
  - The grenade body should be serviced according to TM 9-1330-200-12.
- Procedures for installing and removing the M240 fuze are the same as those used for the M228 TPF.

WARNING

Keep all portions of the hand away from the TPG firing port (nonthreaded end), when installing the M228 TPF, and when throwing the grenade. The fuze explosive charge can cause injury to the hand and fingers when it exits through the firing port.

Wear approved eye protection and gloves when replacing training fuzes to avoid personal injury if the fuze did not detonate.

Do not touch the fuze stem with bare hands; static electricity can detonate the fuze on contact.

Report all misfire and dud fuze details to the range safety officer (known as an RSO) and/or range officer in charge (OIC) or noncommissioned officer in charge (NCOIC). Do not attempt to remove the misfired fuze without hand and eye protection.

CAUTION

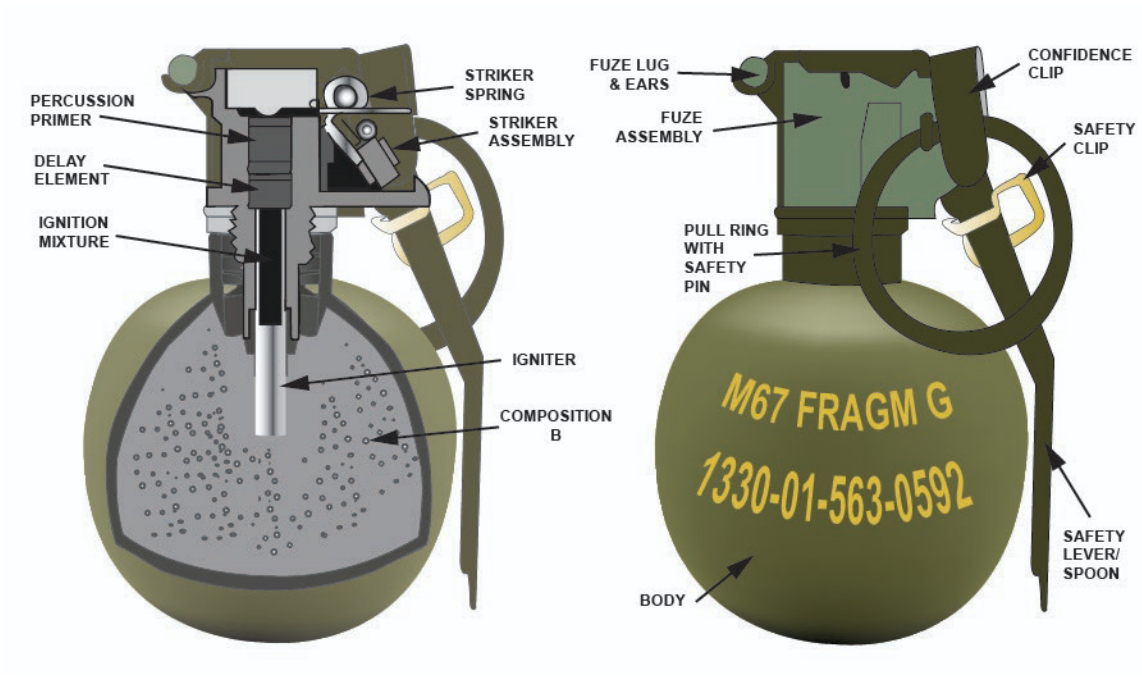
The M228 TPF should be only finger tight. DO NOT overtighten the fuze. This could damage threads in the TPG body and the threaded end of the fuze.

FRAGMENTATION HAND GRENADES

3-12. Fragmentation hand grenades supplement small arms fire against the enemy in close combat. The grenade projects high-velocity fragments in a uniform distribution pattern to produce casualties. Fragmentation hand grenades are used in combat and during training ranges to develop confidence in the munition and to teach Soldiers proper employment techniques to create effective casualty-producing effects for fragmentation grenades. The M67 is the most commonly used fragmentation hand grenade.

3-13. For information on the characteristics and components of fragmentation grenades, see figures 3-12 and 3-13, page 3-18. However, there are other types of hand grenades also suitable for offensive tasks. For more information regarding offensive tasks and the preferred munition, see paragraphs 5-5 through 5-10. For additional information of the M67 fragmentation hand grenade, refer to TM 9-1330-200-12 and TM 43-0001-29.

DODIC: W/O CC G881- W/CC G877	*M67 Fragmentation Hand Grenade*
The M67 is the current fragmentation hand grenade. The M67 projects high-velocity fragments in a uniform distribution pattern to produce casualties. Fragmentation hand grenades supplement small arms fire against the enemy in close combat.	



Note. M67 hand grenades developed before 2009 are not fitted with confidence clips (CCs).

Functioning

Releasing the safety clip, disengaging the pull ring from the CC (if equipped), and removing the safety pin permits the release of the safety lever. When the grenade is thrown, the striker assembly, through action of the spring, throws off the safety lever and impacts the percussion primer that activates the primer charge. The primer charge ignites the delay composition, which will burn approximately 4.0 to 5.5 seconds. Upon completion of burning, the delay composition sets off the igniter for a high order detonation.

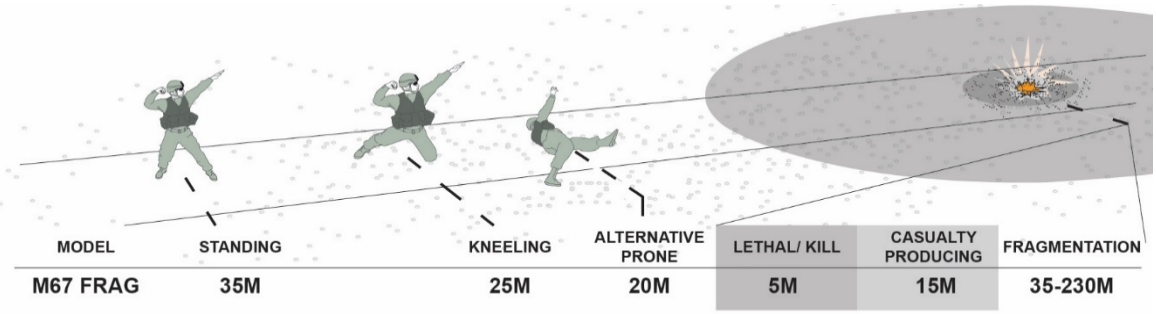
Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Fragmentation M67 Grenade
NSN	W/O CC: 1330-00-133-8244 / W/CC: 1330-01-563-0592
Body/Colors and Markings	Steel sphere with scored steel / olive drab green body with yellow markings
Total Weight	16.0 ounces
Filler	6.5 ounces of Composition B
Fuze and Delay	M213 Fuze – 4.0 to 5.5 seconds
Safety Features	• Confidence clip. • Safety clip. • Pull ring w/ safety pin. • Safety lever.

Legend: DODIC – Department of Defense identification code, NSN – national stock number, W – with, W/O – without

Figure 3-12. M67 fragmentation hand grenade

M67 – DODIC G881	*Average Throwing Distance and Explosive Radius*

Fragmentation Grenade



NOTE: M67 WITH AND WITHOUT CONFIDENCE CLIP (CC) HAVE THE SAME DEPARTMENT OF DEFENSE IDENTIFICATION CODE AND ARE DIFFERENTIATED BY THE NATIONAL STOCK NUMBER (NSN). M67 WITH CC: NSN 1330-01-563-0592 M67 WITHOUT CC: 1330-00-133-8244

Employment

1. Select the appropriate hand grenade based on type of target.
   - The M67 is a casualty-producing munition used to destroy a threat.
   - Use to defeat enemy fighting positions, dismounts in the open, and immobilize light-skinned wheeled vehicles.
   - Projects high-velocity fragments to produces casualties.
2. Select proper throwing position.
   - Ensure you have a proper covered position when employing the M67.
   - Determine the distance to the target.
   - Align your body with the target.
3. Grip the hand grenade.
   - Place the hand grenade in the palm of the throwing hand.
   - Place the safety lever between the first and second joints of the thumb of the throwing hand and wrap the remaining fingers around the grenade to secure a proper right- or left-hand grip.

Note. For left-handed throwers, the grenade is inverted with the top of the fuze facing downwards in the throwing hand.

4. Prepare the hand grenade.
   - Remove the safety clip with your thumb from the nonthrowing hand.
   - Securing a proper right- or left-hand grip, remove the pull ring. On grenades equipped with a confidence clip (if equipped), rotate the pull ring toward the body (right-handed) or away from the body (left-handed) to disengage the pull ring from the confidence clip, or remove the pull ring, and assume the throwing position that best supports employing the grenade for distance and accuracy.
5. Throw within the effective range of the target.
   - Confirm the distance to the target area.
   - Announce FRAG OUT.
   - Throw grenade, landing on or near the target.
   - Seek cover to avoid fragmentation or direct enemy fire.
   - If time permits, assess the effects of the munition.

Legend: DODIC – Department of Defense identification code, FRAG – fragmentation, M – meters, W – with, W/O - without

Figure 3-13. M67 average throwing distance and explosive radius

WARNING

Although the killing radius of the M67 grenade is 5 meters and the casualty-producing radius is 15 meters, fragments can disperse as far as 230 meters.

OFFENSIVE HAND GRENADES

3-14. Offensive hand grenades (known as OHG) (for example, blast overpressure-concussion grenades) are much less lethal than fragmentation grenades on an enemy or threat in open terrain, but they are effective against an enemy within a confined space. Offensive-type hand grenades are lethal- (concussion-blast overpressure) type grenades. The older MK3A2 OHG is restricted for contingency operations to engage enemy threats in close combat. The M111 OHG will replace the MK3A2 OHG and will be available for home station training and worldwide contingency operations.

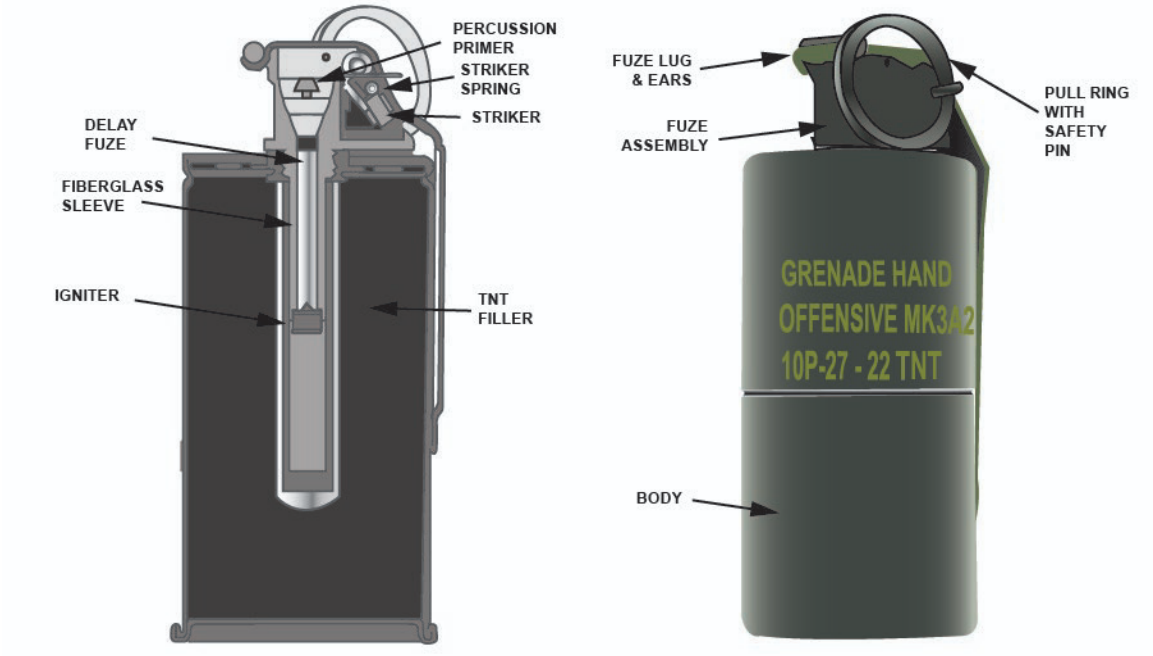
3-15. The OHG may be more appropriate to use in a confined space or in urban operations than a fragmentation grenade in some situations. The shock waves (overpressure) produced by the OHG when used in enclosed or restrictive areas are greater than that produced by the M67 fragmentation grenade, making it more effective against enemy soldiers located in areas, such as—

- Bunkers.
- Fortified positions.
- Trenches.
- Rooms.

3-16. For more information on offensive hand grenades, see figures 3-14 through 3-17 on pages 3-20 through 3-24, according to TM 43-0001-29.

Note. The M111 OHG is the replacement for the MK3A2 OHG. The M112 POHG is the M111 OHG designated trainer to support individual and collective task home station training.

DODIC G911 w/M201A1 MOD 2 G874, or M206A2 G872	*MK3A2 Offensive Hand Grenade*
Use the MK3A2 offensive hand grenade for blast overpressure and concussion effects in enclosed areas. When used in enclosed areas, the shock waves (overpressure) produced by this grenade are greater than those produced by the fragmentation grenade. It is, therefore, more effective against enemy soldiers located in bunkers, buildings, and fortified areas.	



Note. The MK3A2 OHG has been found to contain 17–50 percent chrysotile asbestos in the fiber body and is restricted for use in contingency operations only. In case of emergency use, commanders must limit unit personnel exposure to two or fewer MK3-series grenades detonations in an 8-hour period.

Functioning

Removing the pull ring with safety pin permits release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns 4.0 to 5.5 seconds, then sets off the detonator. The detonator explodes and initiates the explosive charge. When the filler detonates, the force of the explosion dissipates mainly in the form of shock waves rather than high-velocity fragments.

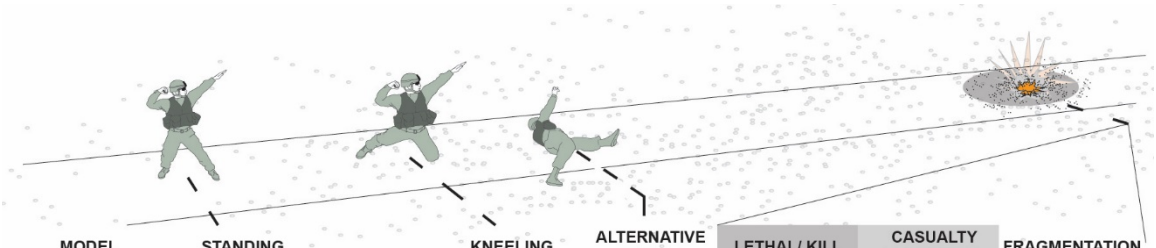
Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Offensive MK3A2
NSN	1330-00-143-6807
Body/Colors and Markings	Cylinder body made of pressed fiber containing high explosive TNT / black body with yellow markings around the middle
Total Weight	15.6 ounces
Filler	8 ounces of TNT
Fuze and Delay	M201A1 MOD 2 or M206A2 – 4 to 5 seconds
Safety Features	• Pull ring w/ safety pin. • Safety lever.

Legend: DODIC – Department of Defense identification code, NSN – national stock number, OHG – offensive hand grenade, TNT – trinitrotoluene, w/ – with

Figure 3-14. MK3A2 offensive hand grenade

MK3A2 – DODIC G911	*Average Throwing Distance and Explosive Radius*

Offensive Grenades



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	LETHAL/ KILL	CASUALTY PRODUCING	FRAGMENTATION
MK3A2	35M	25M	20M	2M	N/A	35-200M
M111 OHG	35M	25M	20M	2M	N/A	35-200M

NOTE: THE 200-METER FRAGMENTATION REFERS TO THE FRAGMENTS FROM THE FUZE THAT MAY EXCEED THE 2-METER RANGE.

Employment

1. Employment considerations.
   - An offensive hand grenade designed to cause overpressure within confined spaces to eliminate or subdue known enemy or hostile personnel within the area.
   - Engage targets by lobbing the grenade through open windows, mouse holes, and confined enemy structures.
   - In building environments, doorways are known as a fatal funnel, and the assault team should lead with a grenade before entering when known threat is in the room to provide the element of surprise and security.
   - Entrances to underground passageways allow the MK3A2 grenade to maximize its effectiveness in close, confined spaces.

WARNING: Using the MK3A2 in these areas presents many dangers to friendly forces due the effects of blast overpressure.

   - Suspected or likely enemy positions on stairwells, provides an advantage by suppressing the enemy with a special-purpose grenade.
   - The employment technique of lobbing hand grenades underhanded or overhanded can be a desirable employment method in the confined and urban environment.

2. Safety considerations.
   - Ensure friendly Soldiers are above ground and overpressure does not affect the tunnel structure or underground structures.
   - Evaluate possible rollback prior to use.

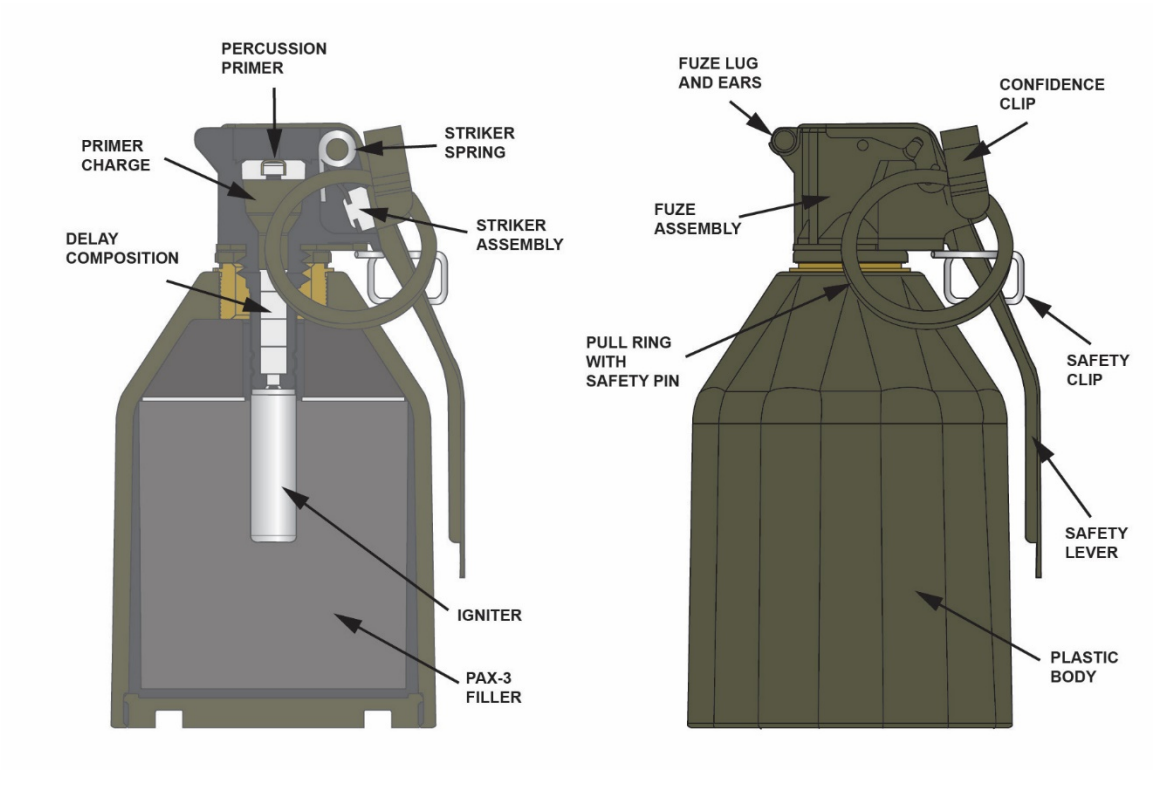
Legend: DODIC – Department of Defense identification code, M – meters, N/A – not applicable, OHG – offensive hand grenade

Figure 3-15. MK3A2 average throwing distance and explosive radius

WARNING

The MK3A2 grenade has an effective kill zone radius of 2 meters in open areas, but fragments and pieces of the fuze have a projected range as far as 200 meters from the detonation point.

DODIC GG37 w/ CC G877	*M111 Offensive Hand Grenade*
The M111 offensive hand grenade is used for blast overpressure and concussion effects in enclosed areas. When used in enclosed areas, this grenade produces shock waves (overpressure) greater than those produced by the fragmentation grenade. It is, therefore, more effective against enemy soldiers located in bunkers, buildings, and fortified areas. The M111 will replace the MK3A2.	



Note. The M111 OHG is for individual and collective training and contingency operations, but due to the blast overpressure associated with the capability, unit commanders will limit personnel exposure in restricted and confined space to no more than three within a 24-hour period.

Functioning

Releasing the safety clip, disengaging the pull ring from the confidence clip, and removing the pull ring with safety pin permits the release of the safety lever. When the grenade is thrown, the striker assembly, through action of the spring, throws off the safety lever and impacts the percussion primer that activates the primer charge. The primer charge ignites the delay composition, which will burn approximately 4.0 to 5.5 seconds. Upon completion of burning, the delay composition sets off the igniter for a high order detonation. The force of the explosion dissipates.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Offensive M111
NSN	1330-01-648-9824
Body/Colors and Markings	Plastic octagonal-shape body / olive drab green body with vertical yellow marking
Total Weight	12.6 ounces
Filler	PAX-3
Fuze and Delay	M213 pyrotechnic delay fuze – 4.0 to 5.5 seconds

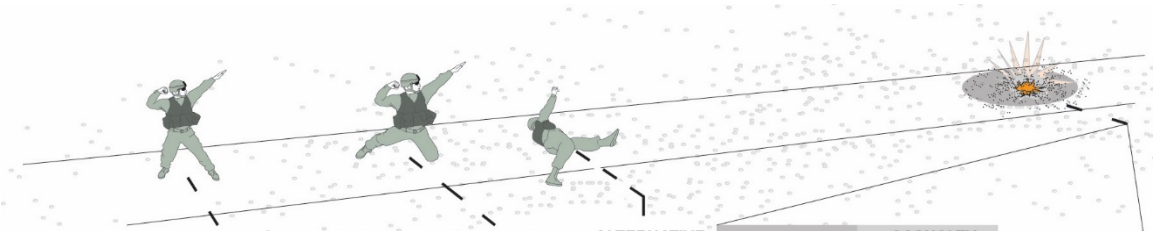
Figure 3-16. M111 offensive hand grenade

DODIC GG37 w/ CC G877	*M111 Offensive Hand Grenade*
Components and Characteristics	***Details***
Safety Features	• Confidence clip. • Safety clip. • Safety pin. • Pull ring. • Safety lever.
Legend: DODIC – Department of Defense identification code, NSN – national stock number, OHG – offensive hand grenade, PAX – Picatinny Arsenal Explosive (high-blast explosive)	

Figure 3-16. M111 offensive hand grenade (continued)

M111 – DODIC GG37	*Average Throwing Distance and Explosive Radius*

Offensive Grenades



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	LETHAL/ KILL	CASUALTY PRODUCING	FRAGMENTATION
MK3A2	35M	25M	20M	2M	N/A	35-200M
M111 OHG	35M	25M	20M	2M	N/A	35-200M

NOTE: THE 200-METER FRAGMENTATION REFERS TO THE FRAGMENTS FROM THE FUZE THAT MAY EXCEED THE 2-METER RANGE.

Employment

1. Employment considerations.
   - An offensive hand grenade designed to cause overpressure within confined spaces to eliminate or subdue known enemy or hostile personnel within the area.
   - Engage targets by lobbing the grenade through open windows, mouse holes, and confined enemy structures.
   - In building environments, doorways are known as a fatal funnel, and the assault team should lead with a grenade before entering when known threat is in the room to provide the element of surprise and security.
   - Entrances to underground passageways allow the M111 OHG to maximize its effectiveness in close, confined spaces.

WARNING: Using the M111 in these areas presents many dangers to friendly forces due the effects of blast overpressure.

   - Suspected or likely enemy positions on stairwells provide an advantage by suppressing the enemy with a special-purpose grenade.
   - Lobbing can be underhand or overhand.

2. Safety considerations.
   - The M111 is fitted with a confidence clip; therefore, confidence clip training is required before training and employment.
   - Double hearing protection is required when employing the M111.
   - All personnel employing the M111 must wear the appropriate PPE according to unit SOP.
   - Ensure friendly Soldiers are above ground and overpressure does not affect the tunnel structure or underground structures.
   - Evaluate possible rollback prior to use.

Legend: DODIC – Department of Defense identification code, M – meters, N/A – not applicable, OHG – offensive hand grenade, PPE – personal protective equipment, SOP – standard operating procedure

Figure 3-17. M111 average throwing distance and explosive radius

WARNING

M111 Offensive Hand Grenade

1. No Soldier shall employ three or more M111 OHGs within a 24-hour period in an enclosed environment.

2. Soldier-safe separation for optical flash is a minimum of 10 meters from the point of detonation.

3. Soldier-safe separation from flash plumes expelled through doors and windows is a minimum of 0.45 meters from point of detonation.

4. Double-hearing protection is required, when employing the M111 OHG.

NONLETHAL HAND GRENADES

3-17. Nonlethal capabilities can reduce the risks of perceived excessive force, promote international political support, alleviate environmental concerns, enhance post-conflict transitions and termination, and reduce the cost of post-conflict reconstruction. Nonlethal grenades are used for diversionary purposes and nonlethal force. They provide a mechanism to confuse and disorient a threat. Nonlethal grenades minimize fatalities and reduce permanent personnel injuries and collateral damage to property and the environment.

3-18. The U.S. Army currently uses two different hand-employed nonlethal grenades. The M84 stun hand grenade is a nonfragmenting grenade designed to temporarily distract a potential threat and the M104 bursting hand grenade is designed to create a diversion and temporarily incapacitate potential threats. For more information, see figures 3-18 through 3-22 on pages 3-27 through 3-31. (For additional information on the M84 and M104, refer to TC 3-19.5, TM 9-1330-200-12, and TM 43-0001-29.)

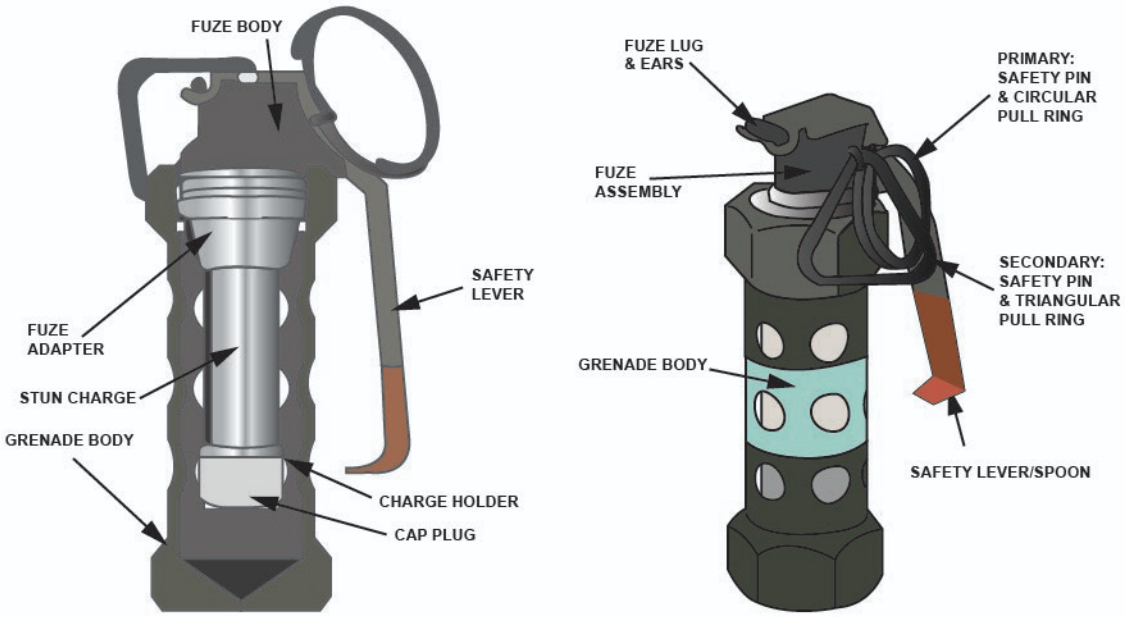
DANGER

Failure to adhere to the fuze delay of 1.0 to 2.3 seconds for the M84 stun and M104 nonlethal bursting hand grenade (known as NLBHG) may lead to personal injury or death. Soldiers must NOT attempt to "cook off" or "milk" the safety lever after removing the primary pull ring with safety pin. Doing so can lead to an early detonation because the fuze time is 1.0 to 2.3 seconds after the pin is pulled. Soldiers must be aware of the delay settings before initiating the munition.

WARNING

Exposure should be limited to two indoors detonation of the M84 stun with a 24-hour period.

DODIC GG09 w/ G874	*M84 Nonlethal Hand Grenade (Stun)*
The M84 stun grenade is a pyrotechnic device for diversionary purposes. The stun grenade is a low hazard, non-shrapnel-producing explosive device that emits an intense light and sound display with minimum smoke. It is a single-use item.	



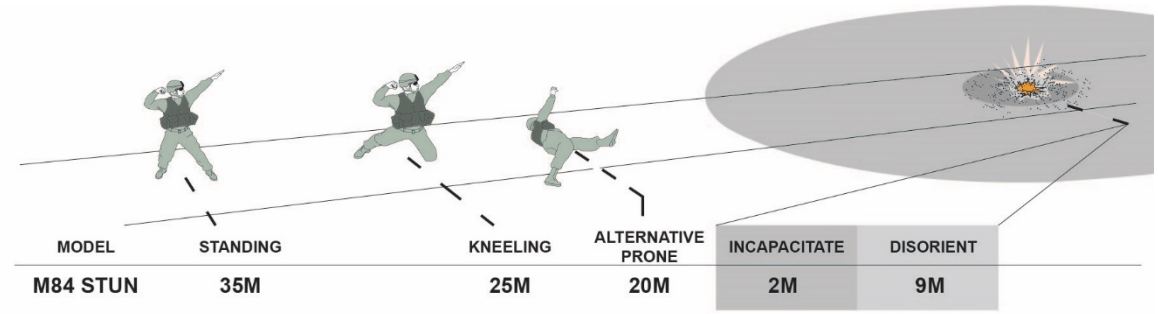
Functioning
Remove the secondary triangular pull ring with safety pin assembly, then the primary circular pull ring with safety pin assembly. Releasing the safety lever allows the spring-loaded striker to hit and ignite the primer. After releasing the safety lever, there is a delay of 1.0 to 2.3 seconds before the stun charge initiates and produces the flash and sound report.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Nonlethal (stun), M84
NSN	1330-01-459-8141
Body/Colors and Markings	Steel hexagon tube with 18 blast and flash release holes along the sides with a heavy steel, hexagon-shaped top and bottom portion / olive drab with white markings, a pastel green band around the middle of the body, and a brown band on the tip end of the safety lever
Total Weight	14.8 ounces
Filler	None
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Triangular pull ring with safety pin. • Circular pull ring with safety pin. • Safety lever.
Legend: DODIC – Department of Defense identification code, NSN – national stock number, w/ – with	

Figure 3-18. M84 nonlethal hand grenade

M84 – DODIC GG09 w/ G874	*Average Throwing Distance and Explosive Radius*

Nonlethal Grenades



Note. Throwing distances are approximate.

Employment

1. Identify components of the M84 and understand the following performance steps:
   - Grasp the grenade firmly and wrap thumb around the safety lever.
   - Remove secondary triangular pull ring with safety pin.
   - Remove circular pull ring with safety pin.
2. Evaluate the scenario to maximize the M84's design.
   - Designed to be thrown into an area when minimum force (tactical or nontactical) is necessary in performing missions, such as rescuing hostages or capturing criminals or other adversaries.
   - Designed for potential threats in forced entry scenarios, urban operations, or crowd control operations.
3. Safety considerations.
   - Ensure the Soldier and all personnel within 25 feet (7.62 meters) wear approved hearing protection when employing the M84 grenade. Recommended in an OE.
   - Human target participants are unauthorized in a training environment.
   - After Soldier throws the grenade in the designated area, all personnel remain in cover to avoid the aftereffects of the M84.
   - In training, a one-time use of the grenade in an enclosed room (approximately 20 feet by 20 feet by 8 feet) should be well ventilated to avoid unacceptable health risks of hydrogen chloride.

WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

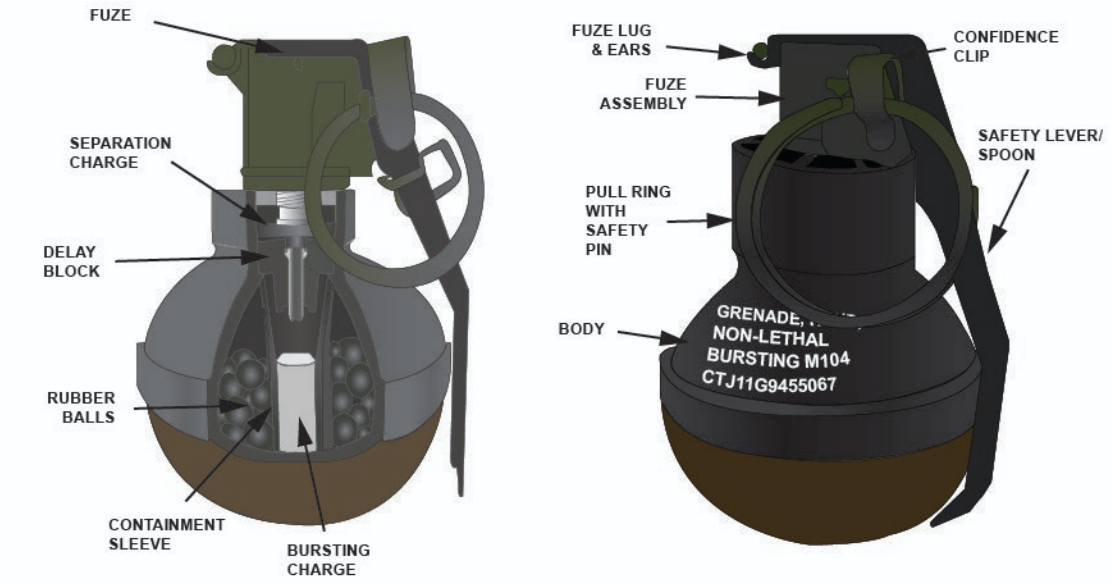
WARNING: Do not attempt to "cook off" or "milk" the safety lever after extracting the pull ring with safety pin, due to the 1.0- to 2.3-second fuze delay. Cook off or milking the safety lever before employment may lead to severe injury or death.

Note. The M84 generates an intensive heat that creates a flash of over 1 million candlepower and a bang between 170 and 180 decibels at 5 feet. The flash may damage eyesight and night vision; the bang may cause hearing loss.

Legend: DODIC – Department of Defense identification code, M – meters, OE – operational environment, w/ – with

Figure 3-19. M84 average throwing distance and explosive radius

DODIC GG04 w/ G874	*M104 Nonlethal Bursting Hand Grenade*
The M104 is a nonlethal bursting hand grenade that disperses rubber projectiles in crowd control situations. The grenade output combines a bright flash and loud explosion and disperses 100 rubber projectiles in a 360° circle to disorient and confuse targeted personnel. (For additional information about this capability, see TC 3-19.5.)	



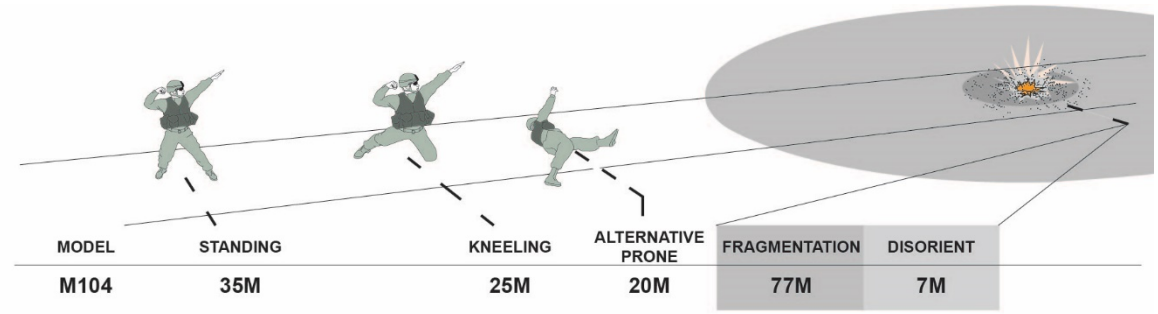
Functioning
To disengage the pull ring from the confidence clip and arm the grenade, see figures 3-46 through 3-49, on pages 3-58 through 3-60. Releasing the safety lever allows the spring-loaded striker to hit the primer and ignite it. By releasing the safety lever, there is a fuze delay of 1.2 to 3.1 seconds; at this point, the fuze system ejects the grenade body and ignites the ignition delay mix. The ignition delay mix will ignite the output charge, and the grenade functions with the rubber balls bursting out of the grenade body (with a total delay time of 3 to 5 seconds).

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Rubber Ball, Nonlethal M104
NSN	1330-01-454-0132
Body/Colors and Markings	Rubber ball with tapered neck / black body with white markings, a pastel green band around the middle, and a brown band on the tip end of the safety lever
Total Weight	12.4 ounces
Filler	225 of 0.314-inch diameter rubber balls
Fuze and Delay	1.2 to 3.1 seconds
Safety Features	• Confidence clip. • Safety clip. • Pull ring with safety pin. • Safety lever.

Legend: DODIC – Department of Defense identification code, NSN – national stock number, w/ – with

Figure 3-20. M104 nonlethal bursting hand grenade

M104 – DODIC GG04	*Average Throwing Distance and Burst Radius*
Nonlethal Grenades	



Employment

1. Employment considerations.
   - Engaging groups or crowds when minimum force is necessary
   - Dismounted patrolling through open or urban terrain.
   - Conducting convoy movements.
   - Breaking contact.
   - Enforcing a buffer zone or standoff between the crowd and friendly forces.
   - The M104 operates like a standard fragmentation hand grenade, detonating a few seconds after the spoon is released and dispersing the filler of rubber balls in a designated area.
   - The M104 has two primary considerations: outdoor and building or room employment.
     - For outdoor employment, the minimum safe distance for the thrower is 4 meters to avoid the effects of the grenade.
     - For building or room employment, you should toss the grenade through an opening or doorway, and then take cover to avoid the effects.
2. Safety considerations.
   - All personnel within a 77-meter radius of an armed or employed M104 are required to wear PPE, eye, and hearing protection.
   - In a training environment, using live-target participants is unauthorized.
   - Do not attempt to toss grenade through glass.

WARNING: DO NOT “COOK OFF” OR “MILK” the grenade.

- Do not "cook off" or "milk” the safety lever after extracting the pull ring with safety pin, due to the 1.0- to 2.3-second fuze delay. Cooking off or milking the safety lever before employment may lead to severe injury or death.

Legend: DODIC – Department of Defense identification code, M – meters, PPE - personal protective equipment

Figure 3-21. M104 average throwing distance and burst radius

WARNING

All personnel within a 77-meter radius of an armed and or employed M104 NLBHG are required to wear PPE, with issued body armor with neck guard, ballistic helmet, ballistic goggles, gloves, and, at a minimum, double-hearing protection.

Degraded performance and high dud rate may occur when exposing the M104 to high humidity (95-percent relative humidity), and/or temperature conditions (less than 0 degrees Fahrenheit or greater than 140 degrees Fahrenheit for more than 14 days while in an unpackaged configuration).

The M104 NLBHG should remain in the M2A1 metal container when transported by helicopter to prevent electrostatic discharge ignition.

M104 NLBHG live-target participation is unauthorized.

Never attempt to "cook off" or "milk" the M104 NLBHG safety lever after pin extraction.

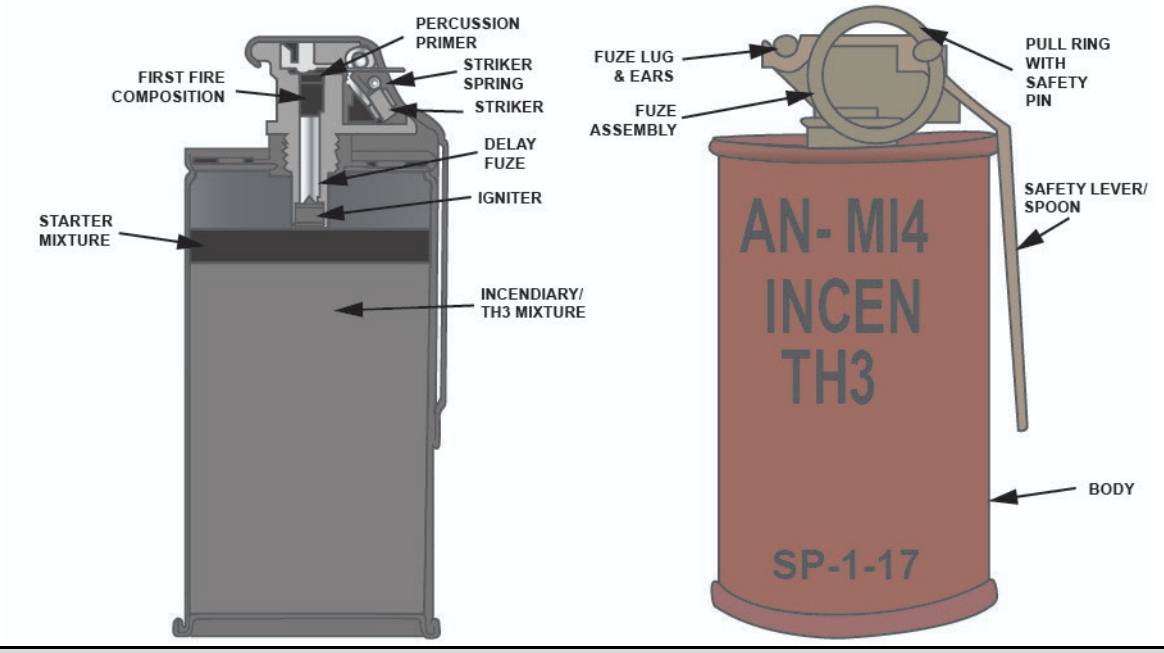
Alternate Employment Technique
USMC Only
Small Arms Weapon Launching System
Note. The Small Arms Weapon Launching System (known as SAWLS) is authorized for use by the USMC, with the M500-series shotgun with launch cup and 12-gauge cartridge to employ the M104 NLBHG.
Only trained and certified personnel will employ the M104 NLBHG using the launch cup.
Prior to launch-cup employment, the Soldier or Marine will ensure the projected flight path or fields of fire are clear of objects that can affect the grenade's flight path. To prevent erratic flight, rebounding, and/or ricocheting during flight, the flight path must be free of obscurations.
Legend: NLBHG – nonlethal bursting hand grenade, USMC – United States Marine Corps

Figure 3-22. Small Arms Weapon Launching System for United States Marine Corps use

CHEMICAL GRENADES

3-19. Chemical grenades provide a source of intense heat to start fires or destroy equipment. They can also be used to incapacitate persons during riots, mobs, and other crowd disturbances. For more information on chemical grenades, see figures 3-23 through 3-30 on pages 3-32 through 3-40.

DODIC G900 w/ G874	***AN-M14 TH3 Incendiary Hand Grenade***
Use the AN-M14 TH3 incendiary hand grenade to destroy equipment or start fires. It can also damage, immobilize, or destroy vehicles, weapons systems, shelters, or munitions. A portion of the TH3 mixture converts to molten iron, which burns at 4,330°F for 30 to 45 seconds. Thermate is an improved version of thermite, the incendiary agent used in hand grenades during World War II.	



Functioning
Removing the safety pin permits release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The primer initiates the first-fire mixture, fuze delay element, ignition mixture, and grenade starter mixture and filler.

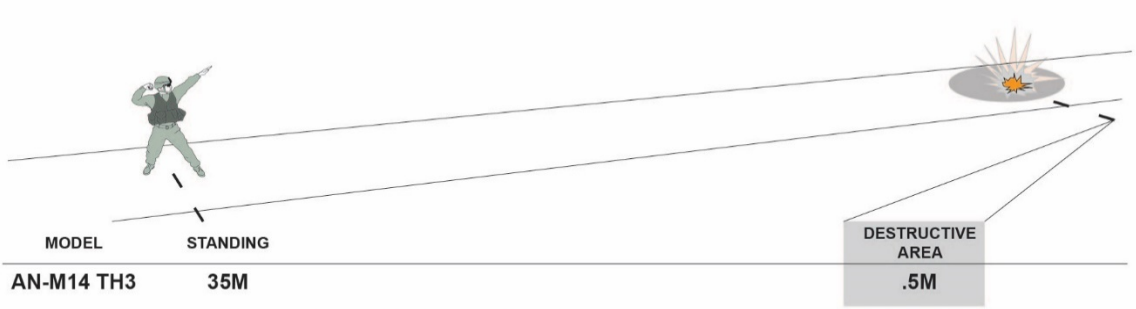
Components and Characteristics	***Details***
Nomenclature	Grenade, Hand Incendiary TH3 AN-M14
NSN	1330-00-219-8557
Body/Colors and Markings	Cylindrical-shaped covered with sheet metal / light red with black markings
Total Weight	32.0 ounces
Filler	26.5 ounces of TH3 mixture
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Safety pin. • Pull ring. • Safety lever.

Legend: DODIC – Department of Defense identification code, F – Fahrenheit, NSN – national stock number, TH3 – thermate, w/ – with

Figure 3-23. AN-M14 TH3 incendiary hand grenade

AN-M14 TH3 – DODIC G900	*Average Throwing Distance and Explosive Radius*

Chemical Grenades



WARNING: THIS GRENADE IS *NOT INTENDED* TO BE THROWN. UNDER *EMERGENCY CONDITIONS*, EMPLOY THE AN-MI4 *ONLY* FROM THE STANDING THROW POSITION.

Employment

1. Employment considerations.
   - Designed to PLACE or DROP close to an object, a piece of equipment, or an area intended to burn.
   - Avoid direct eye contact while the grenade is burning; the light emitting from the mixture is hazardous to the retina.
   - The AN-M14 does not burst and instead will start a fire within the immediate area containing flammable material.
   - The mixture fuzes together the metallic parts of any object it contacts.
   - Due to the nature of the TH3 agent mixture, it can produce its own oxygen and maintain its composition while burning underwater.
   - The TH3 filler of the AN-M14 grenade burns for 45 seconds and can burn through a 1/8-inch homogeneous steel plate.
2. Safety considerations.
   - When employing the AN-M14, ensure all Soldiers wear proper PPE, gloves, and approved eye protection in accordance with APEL standards.

WARNING: DO NOT "cook-off" or "milk" safety lever after extracting the pull ring with safety pin, due to the 1.0- to 2.3-second fuze delay. Cooking off or milking the safety lever before employment may lead to severe injury or death.

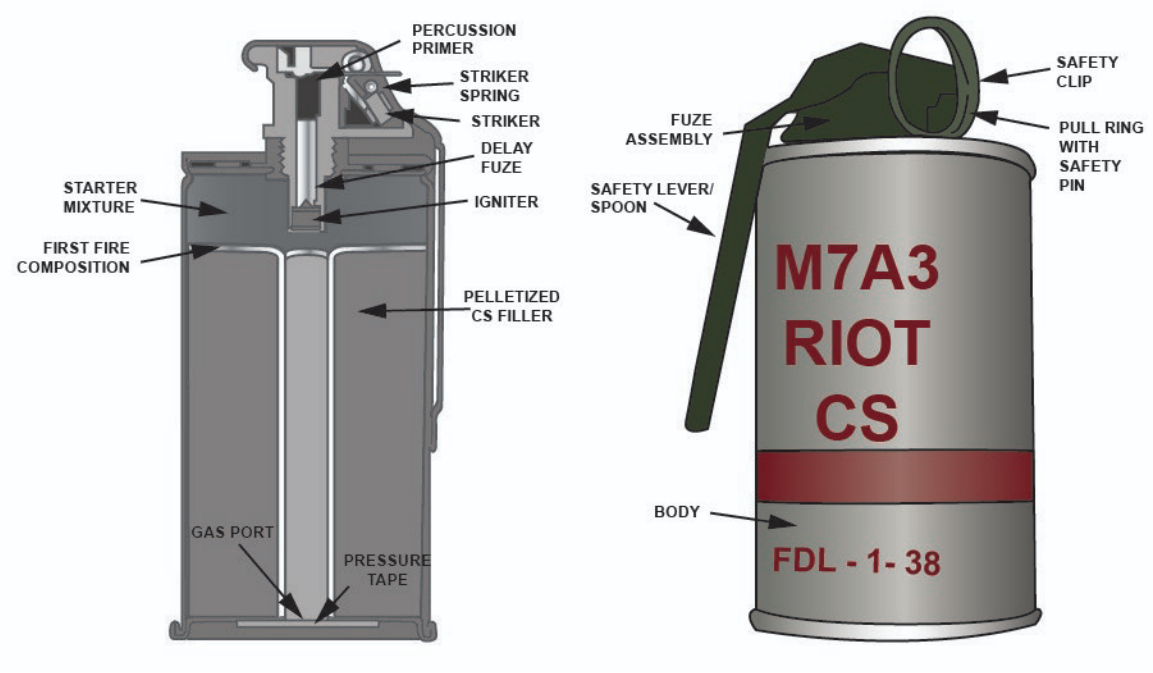
Legend: APEL – Authorized Protective Eyewear List, DODIC – Department of Defense identification code, M – meters, PPE – personal protective equipment, TH3 – thermate

Figure 3-24. AN-M14 TH3 average throwing distance and explosive radius

WARNING

Avoid looking directly at the incendiary hand grenade as it burns. The intensity of the light is hazardous to the retina and can cause permanent eye damage.

DODIC G963 w/ G874	*M7A3 CS Riot Control Hand Grenade*
The M7A3 is a CS-filled burning-type grenade. The choking agent is designed to control counterinsurgencies and for other tactical missions. It is a riot-control grenade that may also be used to simulate casualties during training.	



Functioning
Removing the safety pin permits release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The primer initiates the first fire mixture, fuze delay element, ignition mixture, and grenade starter mixture and filler. The pressure-sensitive tape is blown off the emission holes and CS agent is emitted for 15 to 35 seconds.

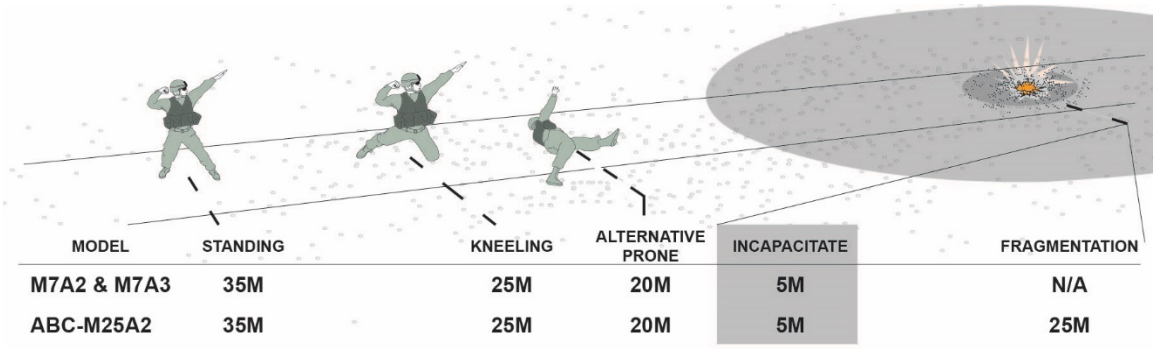
Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Riot CS M7A3
NSN	1330-00-965-0802
Body/Colors and Markings	Cylindrical-shaped sheet metal with four emission holes at the top and one at the bottom / gray body with red bands and markings
Total Weight	15.5 ounces
Filler	7.35 ounces of burning mixture and 4.5 ounces of CS pellets
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Pull ring with safety pin. • Safety lever.

Legend: CS – tear gas, DODIC – Department of Defense identification code, NSN – national stock number

Figure 3-25. M7A3 CS riot control hand grenade

M7A3 – DODIC G963	*Average Throwing Distance and Duration Zone*

Chemical Grenades



Employment

1. Employment considerations.
   - This is a nonlethal grenade used to deter crowds or groups with minimum force necessary.
   - The M7A3 has a powerful lachrymal effect that irritates the face and upper respiratory.
   - Other side effects of CS exposure include coughing, difficulty breathing, and chest tightening.
   - The onset of incapacitation is 15 to 30 seconds and duration is less than 10 minutes after personnel move to fresh air.
   - Heavy concentrations will cause excessive nausea and vomiting.
   - Effectively employing the M7A3 depends on the suitability of the desired location and suitable wind conditions.
2. Safety considerations.
   - Ensure all personnel wear proper PPE and protective masks before employing this grenade.
   - Soldiers should not touch any parts of their face or eyes while exposed to CS; effects will take long to dissipate.
   - Personnel should consider weather considerations before using the M7A3 to ensure downwind considerations affect enemy forces and not friendly forces.
   - The M7A3 has five emission holes (four on top, one on the bottom) that will throw sparks up to 1 meter, which can ignite dry vegetation or other flammable material.

WARNING: DO NOT “COOK OFF” OR “MILK” the grenade.

Legend: CS – tear gas, DODIC – Department of Defense identification code, M – meters, N/A – not applicable, PPE – personal protective equipment

Figure 3-26. M7A3 CS average throwing distance and duration

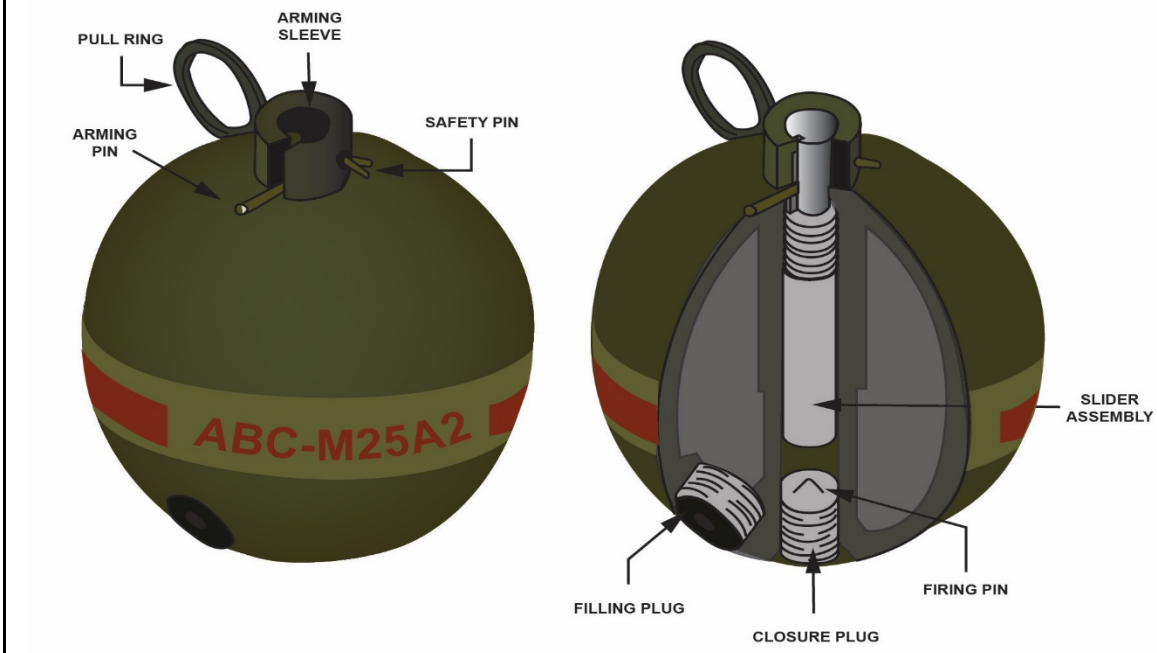
CAUTION

Riot-control grenades throw sparks up to 1 meter from the point of detonation, which can ignite vegetation and other flammable materials. Use extreme caution when employing this capability.

WARNING

Do not use a riot-control grenade in an enclosed area. If you must remain in the area, always wear a protective mask.

DODIC G924 w/ Integral Fuze	*ABC-M25A2 Riot Control Hand Grenade*
The ABC-M25A2 is a bursting-type riot-control hand grenade and may be used to simulate casualty agents during training. It delivers three types of riot-control agents: CS, CN, and DM. CS is similar to CN, except it is more persistent and has a more severe reaction. Safety clips are not required for these grenades.	



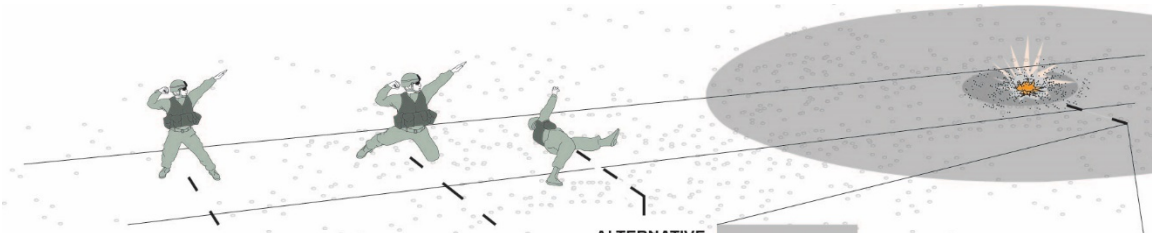
Functioning
The safety pin locks the arming sleeve to the grenade body through the slider assembly. It also retains the arming pin in a horizontal position. When the safety pin is removed, the arming sleeve is free to separate from the grenade body. The slider assembly is released and is driven against the firing pin. The firing pin initiates a primer in the end of the slider. The primer initiates the delay column, which, in turn, initiates the detonator. The detonator shatters the grenade body, dispersing the agent.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Riot CS-1 ABC-M25A2
NSN	1330-00-645-6211
Body/Colors and Markings	Plastic Sphere / gray body with a single red band and red markings
Total Weight	7.5 to 8.0 ounces (depending on which type of filler is used)
Filler	Can be filled with CS-1, CN-1, or DM-1. All fillers are mixed with silica aerogel for increased dissemination efficiency.
Fuze and Delay	Integral fuze – 1.4 to 3.0 seconds
Legend: CN – chloroacetophenone, CS – tear gas, DODIC – Department of Defense identification code, DM – diphenylaminechloroarsine, NSN – national stock number, w/ – with	

Figure 3-27. ABC-M25A2 riot control hand grenade

ABC M25A2 – DODIC G924	Average Throwing Distance and Explosive Radius

Chemical Grenades



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	INCAPACITATE	FRAGMENTATION
M7A2 & M7A3	35M	25M	20M	5M	N/A
ABC-M25A2	35M	25M	20M	5M	25M

Employment

1. Employment considerations.
   - This is a nonlethal grenade used to deter crowds or groups with minimum force necessary.
   - The ABC M25A2 has a powerful lachrymal effect that irritates the face and upper respiratory.
   - Other side effects of CS exposure include coughing, difficulty breathing, and chest tightness.
   - The onset of incapacitation is 15 to 30 seconds and duration is less than 30 minutes after personnel move to fresh air.
   - Heavy concentrations will cause excessive nausea and vomiting.
   - Effectively employing the ABC M25A2 depends on the suitability of the desired location and suitable wind conditions.
2. Safety considerations.
   - Ensure all personnel wear proper PPE and protective masks before employing this grenade.
   - Soldiers should not touch any parts of their face or eyes while exposed to CS; effects will take long to dissipate.
   - Personnel should consider weather conditions before using the ABC M25A2 to ensure downwind considerations affect enemy forces and not friendly forces.
   - Fragments may expand from the body of the ABC M25A2 and create a 25-meter burst radius.

WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

Legend: CS – tear gas, DODIC – Department of Defense identification code, M – meters, N/A – not applicable, PPE – personal protective equipment

Figure 3-28. ABC-M25A2 average throwing distance and explosive radius

3-20. The ABC-M25-series grenades use an integral fuze that functions as follows:

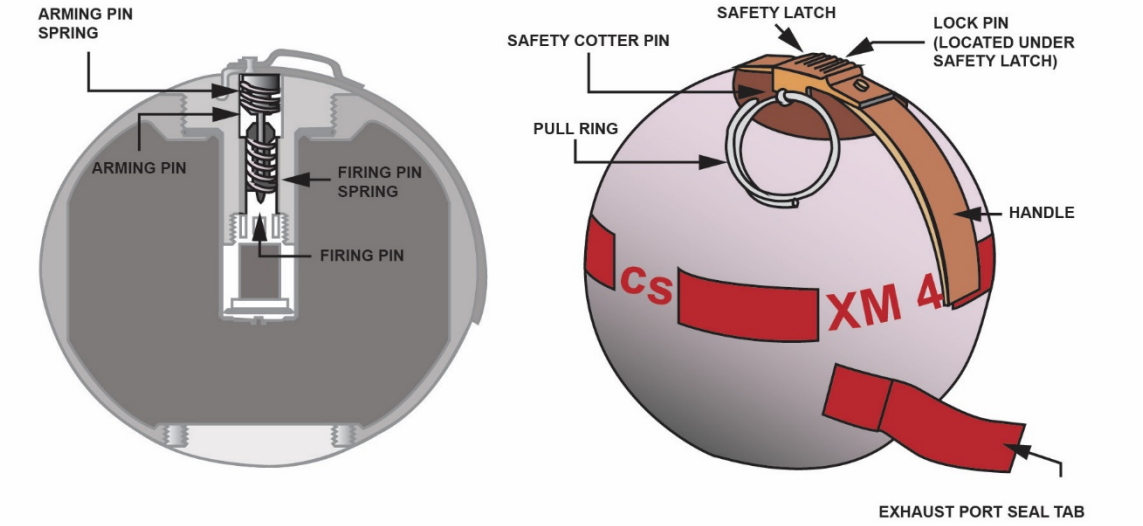
- When the safety pin is removed, the arming sleeve is held in place with the thumb.
- Releasing the arming sleeve forces the slider assembly downward toward the firing pin under pressure of the firing spring.
- At the bottom of the fuze well, the slider strikes the firing pin and ignites the delay element, which, in turn, sets off the detonator.

WARNING

When the ABC-M25A2 grenade is employed, DO NOT drop it because it may immediately go off.

DO NOT attempt to replace a pulled safety pin and DO NOT relax thumb pressure on the arming sleeve after the safety pin is pulled.

DODIC G922 w/ Integral Fuze	*M47 CS Riot Control Hand Grenade*
The M47 grenade is a special-purpose burning-type munition used for riot control and counterinsurgencies. This grenade is a nonlethal, incapacitating-type munition that contains a nonpersistent CS agent. Discharging the CS results in erratic "skittering" of the grenade on the ground, making it difficult for rioters to recover and throw it back.	



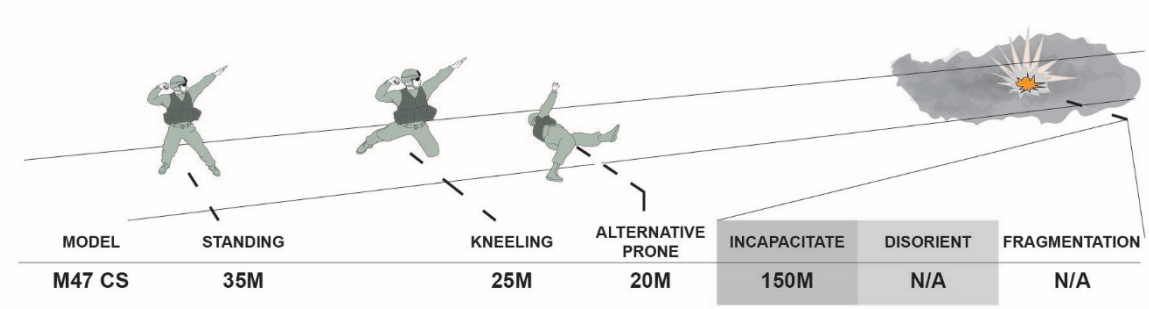
Functioning
First, remove the tape over the emission port, then pull the safety pin. Slide the safety latch into the armed position. The arming handle is then free to separate from the grenade body. The firing pin initiates a primer, which, in turn, initiates the delay charge that lights the ignition mix. The built-up pressure forces the CS mixtures through the emission port dispersing the agent.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Riot Control CS M47
NSN	1330-00-477-6704
Body/Colors and Markings	Spherical rubber body assembly / gray body with a red band and red markings
Total Weight	14.4 ounces
Filler	6.5 ounces of CS pyrotechnic granulated mixture
Fuze and Delay	M227 – 2.5 to 3.5 seconds
Legend: CS – tear gas, DODIC – Department of Defense identification code, NSN – national stock number, w/ – with	

Figure 3-29. M47 CS riot control hand grenade

M47 CS – DODIC G922	*Average Throwing Distance and Explosive Radius*

Chemical Grenades



Employment

1. Employment considerations.
   - This is a nonlethal grenade used to deter crowds or groups with minimum force necessary.
   - When employed, this grenade moves sporadically dispersing CS and makes it difficult for combatants to throw the munitions back.
   - The M47 has a powerful lachrymal effect that irritates the face and upper respiratory.
   - Other side effects of CS exposure include coughing, difficulty breathing, and chest tightening.
   - The onset of incapacitation is 15 to 30 seconds and duration is less than 30 minutes after personnel move to fresh air.
   - Heavy concentrations will cause excessive nausea and vomiting.
   - Effectively employing the M47 depends on the suitability of the desired location and suitable wind conditions.

WARNING: DO NOT “COOK OFF” OR “MILK” the grenade.

2. Safety considerations.
   - Ensure all personnel wear proper PPE and protective masks before employing this grenade.
   - In training environments, ensure Soldiers do not touch any parts of their face or eyes while affected by CS; effects will take long to dissipate.

Legend: CS – tear gas, DODIC – Department of Defense identification code, M – meters, N/A – not applicable, PPE – personal protective equipment

Figure 3-30. M47 CS average throwing distance and explosive radius

3-21. The M47 grenade uses an integral fuze that functions as follows:

- Remove and discard the grenade’s exhaust port seal pull-tab immediately before pulling the safety cotter pin.
- When the safety cotter pin is removed and the safety latch is pushed rearward from the locking pin, the handle is unlocked, and the grenade is armed.

SMOKE GRENADES AND SIGNALS

3-22. Ground Soldiers employ the M18 smoke hand grenade (green, yellow, red, and violet) to conduct prearranged signaling and communication of ground-to-ground and ground-to-air supporting units. Soldiers employ the AN-M8 hexachloroethane-zinc (known as HC) or the M83 terephthalic acid (known as TA) burning-type smoke grenade provides 70 to 90 seconds of obscuration smoke to obscure the tactical small unit's movement. They can also employ the bursting-type M106 screening obscuration device-visual restricted terrain (known as SOD-Vr) for near instantaneous obscuration screen to break the enemies' line of sight or for immediate 35 seconds of obscuration smoke. Smoke hand grenades are "burning-type grenades," and they burn oxygen and are NOT to be employed in enclosed, confined space, or in buildings.

3-23. Prior to employing smoke grenades, leaders must consider the terrain and understand each munition's limitations. Using the small area screening method, Soldiers identify the proper dimension required and enable the munition to reach the desired horizontal above ground level (AGL) requirements.

3-24. For obscuration smoke in a small area screening in open terrain, the dimensions need to be at 7.5 meters in width times 14 meters in length times 15 meters in horizontal clearance ([7.5mW] X [14mL] X [15mH]). Obscuration smoke grenades have a 10,000-foot AGL requirement.

3-25. For signal smoke grenades (green, yellow, red, and violet) in open, restrictive, and enclosed terrain, the estimate is ~500-meter width times a 1,500-meter horizontal clearance. Signal smoke grenades have a 5,000-foot AGL requirement. See figures 3-31 through 3-46, pages 3-42 through 3-58. (Figure 3-39 on page 3-49 discusses MK-series smoke grenade use for the U.S. Marine Corps.)

WARNING

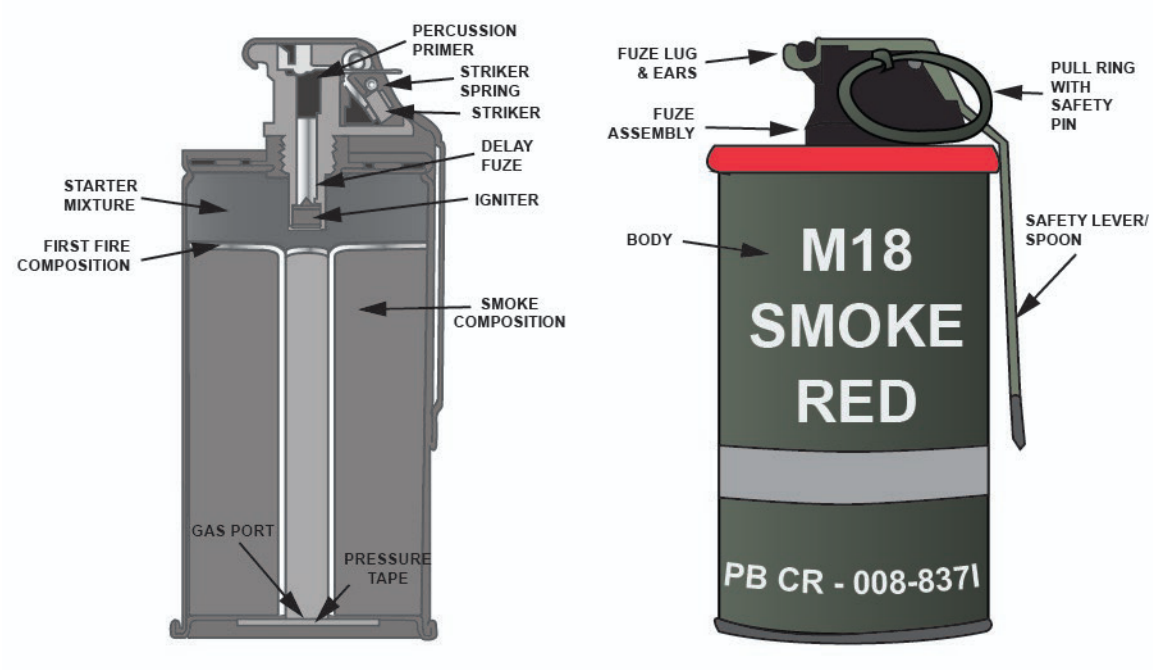
Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen. Use of signaling colored smoke hand grenade are harmful to personnel and may cause fires inside of confined spaces. Therefore, DO NOT use burning grenades in enclosed or confined spaces.

Smoke (canister shape) hand grenade has a standard 1.0- to 2.3-second fuze delay. The user will NOT "cook off" or "milk" the safety lever after arming the grenade to allow smoke to billow before employment or before the grenade gets too hot to handle. The user will secure a proper grip, extract the pull ring with safety pin, and employ the grenade with safety lever.

There are two types of smoke obscuration hand grenades. The AN-M8 HC and M83 TA are burning-type grenades, and the M106 SOD-Vr is a bursting-type grenade. The M106 SOD-Vr requires unit-level training before use.

DODIC G940, G945, G950, G955 w/ G874	*M18 Smoke Hand Grenade (Red)*

The color of the M18 smoke hand grenade is depicted by the color of the top of the grenade. The grenade comes in four basic colors: green (G940), yellow (G945), red (G950), or violet (G955). Smoke grenades are used for means of communication for ground-to-ground or ground-to-air signaling, conveying information through prearranged signals.



Note. The M18 red is an example of the characteristics of the M18-series smoke grenades.

Functioning

Removing the pull ring with safety pin permits release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The fuze delay element initiates the starter patch, mixture, and filler. The pressure sensitive tape is blown off the emission hole at the bottom of the grenade, and the colored smoke emits from the bottom hole.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand Smoke, M18
NSN	1330-00-289-6852 (Red), 1330-00-289-6851 (Green), 1330-00-289-6854 (Yellow), 1330-00-289-6853 (Violet)
Body/Colors and Markings	A cylinder of thin sheet metal long with one hole at the bottom / forest green body with light green markings. The color of the top indicates the color of the smoke.
Total Weight	16 ounces
Filler	11.5 ounces of colored smoke mixture
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Pull ring with safety pin. • Safety lever.

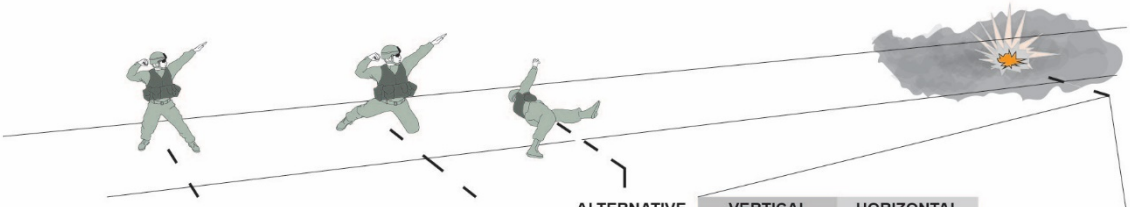
Legend: DODIC – Department of Defense identification code, NSN – national stock number, w/ – with

Figure 3-31. M18 smoke hand grenade (red)

M18 – RED DODIC G950	M18 – YELLOW DODIC G945	M18 – GREEN DODIC G940	M18 – VIOLET DODIC G955

Average Throwing Distance and Marking Zone

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
M18 RED	35M	25M	20M	1500M	3M	70-90 SEC
M18 YELLOW	35M	25M	20M	1500M	3M	70-90 SEC
M18 GREEN	35M	25M	20M	1500M	3M	70-90 SEC
M18 VIOLET	35M	25M	20M	1500M	3M	70-90 SEC

Employment

WARNING: For real-world injuries or casualties during training operations, the color of the smoke (if used) should be discussed during paragraph five of the OPORD.

1. Use the smoke grenades in training and battlefield operations to—
   - Signal ground-to-air rotary or fixed wing aircrafts.
   - Signal ground-to-ground wheeled or track vehicles.
   - Mark landing zones for cargo drop-off location or evacuating casualties.
   - Mark enemy targets for friendly forces.
   - Create a diversionary tactic.
   - Obscure movement techniques through terrain and urban areas.
2. Safety considerations.

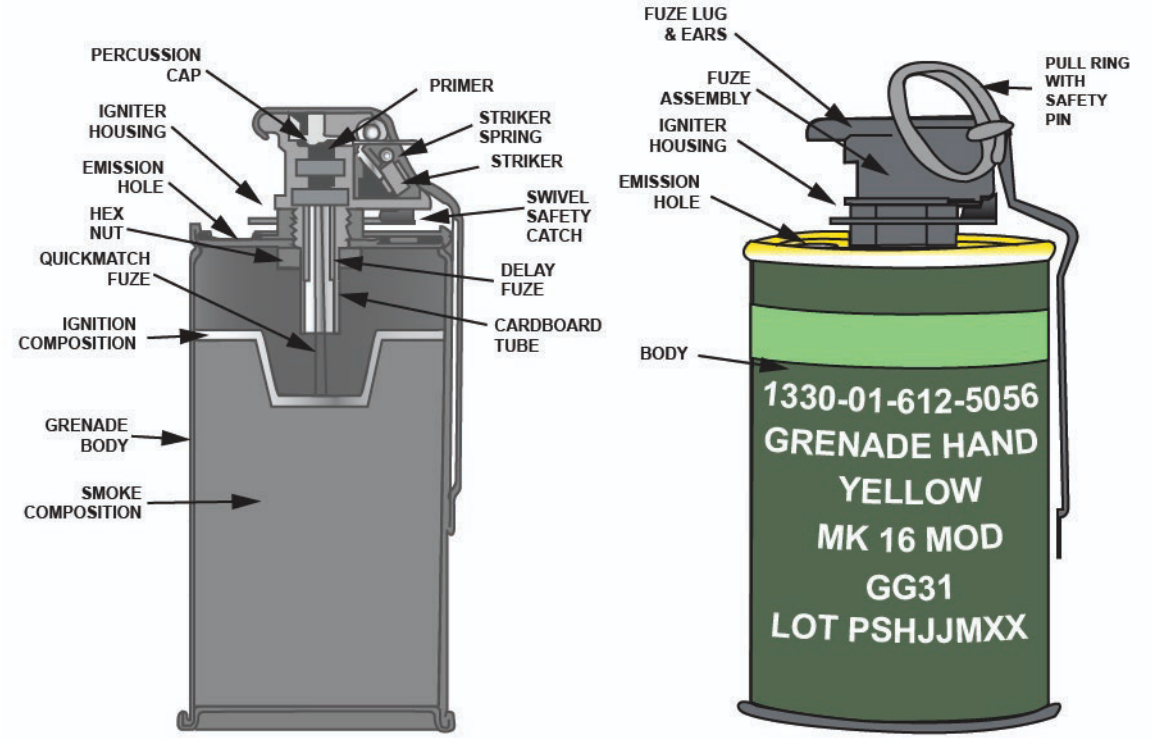
WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

- All smoke grenades should only be used for outdoor employment.
- Personnel should consider weather conditions before using the M18 to ensure downwind considerations do not affect friendly forces.
- Do not use the M18 smoke grenade within 50 feet of flammable materials.
- Keep all body parts away from emission hole of grenade while smoke is produced.
- Do not release safety lever before employment or hold onto grenade to allow smoke to billow before employment “Pull Pin and Throw”

Legend: DODIC – Department of Defense identification code, M – meters, OPORD – operation order, SEC – second

Figure 3-32. M18 average throwing distance and marking zone

DODIC GG31	*MK16 MOD 0 Hand Grenade Smoke (Yellow)*
Use the MK16 MOD 0 colored smoke grenade as a means of communication for ground-to-ground or ground-to-air signaling, conveying information through a prearranged signal, or screening unit movements. Additionally, colored smoke grenades are used for marking helicopter-landing zones for evacuation, marking cargo drop-off locations and targets, and indicating diversionary tactics and battlefield maneuvers.	



Functioning

Twist the pull-ring clockwise towards the fly-off lever and pull the safety pin by the pull-ring. The torsion spring of the ignition system forces the impact striker in a circular motion and force of the torsion spring moves the fly-off lever away from the igniter head. The impact striker hits the percussion cap/primer with the force from the torsion spring. The designed kinetic energy of this movement ignites the primer. The impact process ignites the pyrotechnic composition inside of the percussion cap and starts the ignition chain. If there is suddenly no need to use the SCSG and the safety pin is already disengaged, the operator can cease throwing procedures by engaging the swivel safety catch with a simple circular motion. This locks the safety lever and sets the fuze into a safe position.

Components and Characteristics	*Details*
Nomenclature	Grenade Hand smoke, MK16 MOD 0
NSN	1330-01-612-5056
Body/Colors and Markings	A cylinder of thin sheet metal long with one hole at the top / forest green body with white markings and light green band on the top ***Note.*** The color of the top indicates the color of the smoke.
Total Weight	16 ounces
Filler	11.5 ounces of colored smoke mixture (yellow)
Fuze and Delay	Internal fuze assembly – 2.0 seconds (+/- 0.5 seconds)

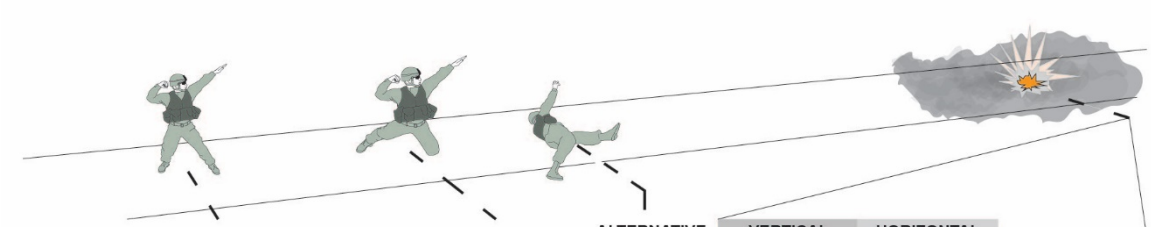
Legend: DODIC – Department of Defense identification code, NSN – national stock number, SCSG – signaling colored smoke grenade

Figure 3-33. MK16 MOD 0 hand grenade smoke (yellow)

MK16 – YELLOW *DODIC GG31*	*MK17 – GREEN* *DODIC GG32*	*MK19 – WHITE* *DODIC GG34*

Average Throwing Distance and Marking Zone

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
MK16 YELLOW	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK17 GREEN	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK19 WHITE	35M	25M	20M	1500M	3M	60(+/-10)SEC

Employment

WARNING: For real-world injuries or casualties during training operations, the color of the smoke (if used) should be discussed during paragraph five of the OPORD.

1. Use the smoke grenades in training and battlefield operations to—
   - Signal ground-to-air rotary or fixed wing aircrafts.
   - Signal ground-to-ground wheeled or track vehicles.
   - Mark landing zones for cargo drop-off location or evacuating casualties.
   - Mark enemy targets for friendly forces.
   - Create a diversionary tactic.
   - Obscure movement techniques through terrain and urban areas.
2. Safety considerations.

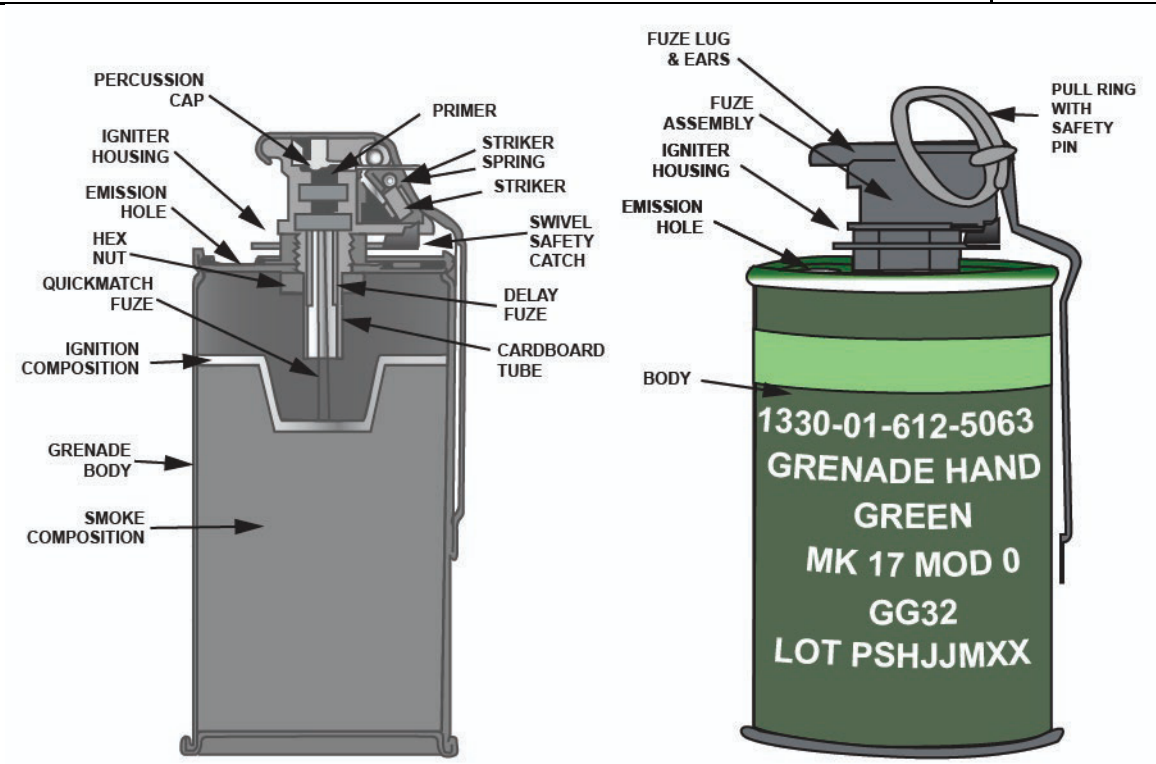
WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

- All smoke grenades should only be used for outdoor employment.
- Personnel should consider weather conditions before using the M18 to ensure downwind considerations do not affect friendly forces.
- Do not use the M18 smoke grenade within 50 feet of flammable materials.
- Keep all body parts away from emission hole of grenade while smoke is produced.
- Do not release safety lever before employment or hold onto grenade to allow smoke to billow before employment “Pull Pin and Throw”

Legend: DODIC – Department of Defense identification code, M – meters, OPORD – operation order, SEC – second

Figure 3-34. MK16 MOD 0 average throwing distance and marking zone

DODIC GG32	*MK17 MOD 0 Hand Grenade Smoke (Green)*
Use the MK17 MOD 0 colored smoke grenade as a means of communication for ground-to-ground or ground-to-air signaling, conveying information through a prearranged signal, or screening unit movements. Additionally, colored smoke grenades are used for marking helicopter-landing zones for evacuation, marking cargo drop-off locations and targets, and indicating diversionary tactics and battlefield maneuvers.	



Functioning

Twist the pull-ring clockwise towards the fly-off lever and pull the safety pin by the pull-ring. The torsion spring of the ignition system forces the impact striker in a circular motion and force of the torsion spring moves the fly-off lever away from the igniter head. The impact striker hits the percussion cap/primer with the force from the torsion spring. The designed kinetic energy of this movement ignites the primer. The impact process ignites the pyrotechnic composition inside of the percussion cap and starts the ignition chain. If there is suddenly no need to use the SCSG and the safety pin is already disengaged, the operator can cease throwing procedures by engaging the swivel safety catch with a simple circular motion. This locks the safety lever and sets the fuze into a safe position.

Components and Characteristics	*Details*
Nomenclature	Grenade Hand smoke, MK17 MOD 0
NSN	1330-01-612-5063
Body/Colors and Markings	A cylinder of thin sheet metal long with one hole at the top / forest green body with white markings and light green band on the top ***Note.*** The color of the top indicates the color of the smoke.
Total Weight	16 ounces
Filler	11.5 ounces of colored smoke mixture (green)
Fuze and Delay	Internal fuze assembly – 2.0 seconds (+/- 0.5 seconds)

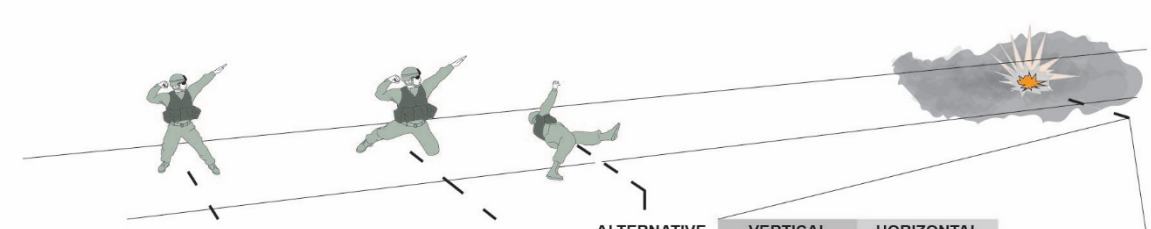
Legend: DODIC – Department of Defense identification code, NSN – national stock number, SCSG – signaling colored smoke grenade

Figure 3-35. MK17 MOD 0 hand grenade smoke (green)

MK16 – YELLOW DODIC GG31	MK17 – GREEN DODIC GG32	MK19 – WHITE DODIC GG34

Average Throwing Distance and Marking Zone

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
MK16 YELLOW	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK17 GREEN	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK19 WHITE	35M	25M	20M	1500M	3M	60(+/-10)SEC

Employment

WARNING: For real-world injuries or casualties during training operations, the color of the smoke (if used) should be discussed during paragraph five of the OPORD.

1. Use the smoke grenades in training and battlefield operations to—
   - Signal ground-to-air rotary or fixed wing aircrafts.
   - Signal ground-to-ground wheeled or track vehicles.
   - Mark landing zones for cargo drop-off location or evacuating casualties.
   - Mark enemy targets for friendly forces.
   - Create a diversionary tactic.
   - Obscure movement techniques through terrain and urban areas.
2. Safety considerations.

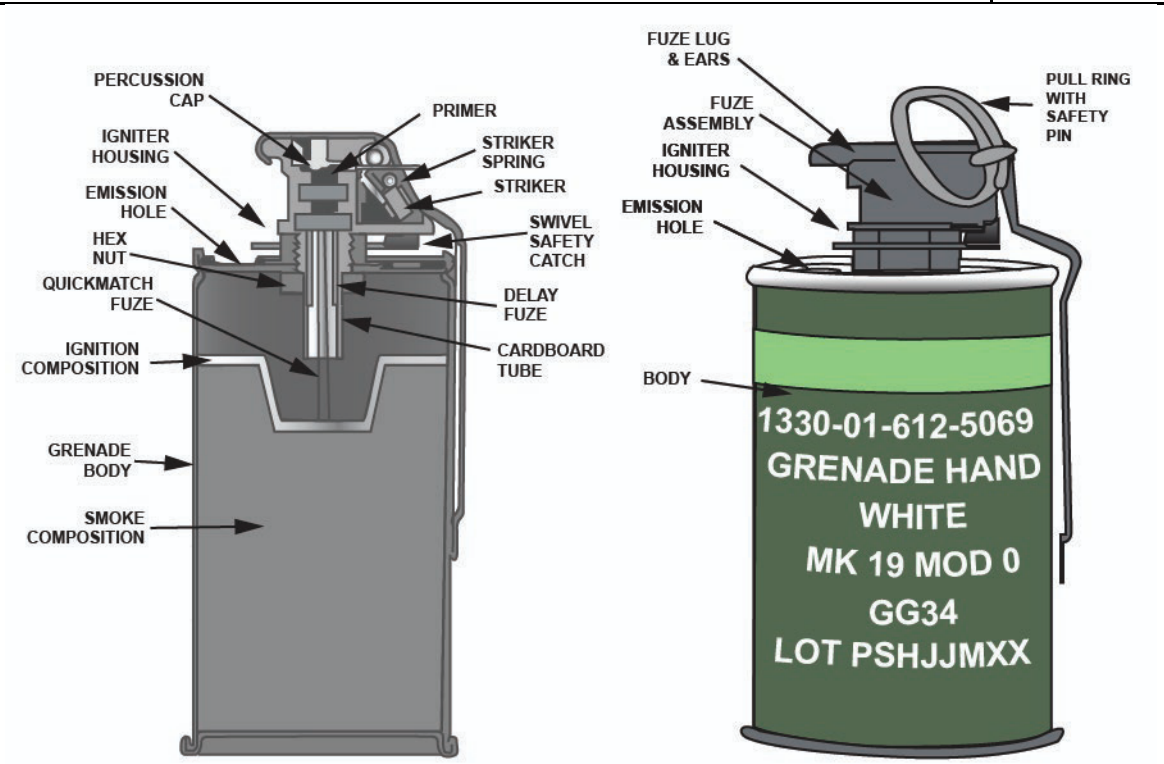
WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

- All smoke grenades should only be used for outdoor employment.
- Personnel should consider weather conditions before using the M18 to ensure downwind considerations do not affect friendly forces.
- Do not use the M18 smoke grenade within 50 feet of flammable materials.
- Keep all body parts away from emission hole of grenade while smoke is produced.
- Do not release safety lever before employment or hold onto grenade to allow smoke to billow before employment “Pull Pin and Throw”

Legend: DODIC – Department of Defense identification code, M – meters, OPORD – operation order, SEC – second

Figure 3-36. MK17 MOD 0 average throwing distance and marking zone

DODIC GG34	*MK19 MOD 0 Hand Grenade Smoke (White)*
Use the MK19 MOD 0 colored smoke grenade as a means of communication for ground-to-ground or ground-to-air signaling, conveying information through a prearranged signal, or screening unit movements. Additionally, colored smoke grenades are used for marking helicopter-landing zones for evacuation, marking cargo drop-off locations and targets, and indicating diversionary tactics and battlefield maneuvers.	



Functioning

Twist the pull-ring clockwise towards the fly-off lever and pull the safety pin by the pull-ring. The torsion spring of the ignition system forces the impact striker in a circular motion and force of the torsion spring moves the fly-off lever away from the igniter head. The impact striker hits the percussion cap/primer with the force from the torsion spring. The designed kinetic energy of this movement ignites the primer. The impact process ignites the pyrotechnic composition inside of the percussion cap and starts the ignition chain. If there is suddenly no need to use the SCSG and the safety pin is already disengaged, the operator can cease throwing procedures by engaging the swivel safety catch with a simple circular motion. This locks the safety lever and sets the fuze into a safe position.

Components and Characteristics	*Details*
Nomenclature	Grenade Hand smoke, MK19 MOD 0
NSN	1330-01-612-5069
Body/Colors and Markings	A cylinder of thin sheet metal long with one hole at the top / forest green body with white markings and light green band on the top ***Note.*** The color of the top indicates the color of the smoke.
Total Weight	16 ounces
Filler	11.5 ounces of colored smoke mixture (white)
Fuze and Delay	Internal Fuze assembly – 2.0 seconds (+/- 0.5 seconds)

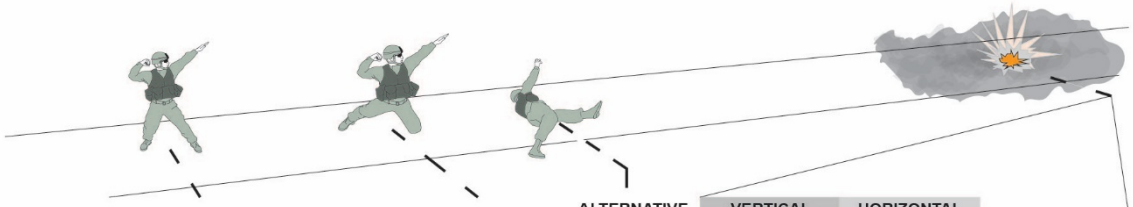
Legend: DODIC – Department of Defense identification code, NSN – national stock number, SCSG – signaling colored smoke grenade

Figure 3-37. MK19 MOD 0 hand grenade smoke (white)

MK16 – YELLOW DODIC GG31	MK17 – GREEN DODIC GG32	MK19 – WHITE DODIC GG34

Average Throwing Distance and Marking Zone

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
MK16 YELLOW	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK17 GREEN	35M	25M	20M	1500M	3M	60(+/-10)SEC
MK19 WHITE	35M	25M	20M	1500M	3M	60(+/-10)SEC

Employment

WARNING: For real-world injuries or casualties during training operations, the color of the smoke (if used) should be discussed during paragraph five of the OPORD.

1. Use the smoke grenades in training and battlefield operations to—
   - Signal ground-to-air rotary or fixed wing aircrafts.
   - Signal ground-to-ground wheeled or track vehicles.
   - Mark landing zones for cargo drop-off location or evacuating casualties.
   - Mark enemy targets for friendly forces.
   - Create a diversionary tactic.
   - Obscure movement techniques through terrain and urban areas.
2. Safety considerations.

WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

- All smoke grenades should only be used for outdoor employment.
- Personnel should consider weather conditions before using the M18 to ensure downwind considerations do not affect friendly forces.
- Do not use the M18 smoke grenade within 50 feet of flammable materials.
- Keep all body parts away from emission hole of grenade while smoke is produced.
- Do not release safety lever before employment or hold onto grenade to allow smoke to billow before employment “Pull Pin and Throw”

Legend: DODIC – Department of Defense identification code, M – meters, OPORD – operation order, SEC – second

Figure 3-38. MK19 MOD 0 average throwing distance and marking zone

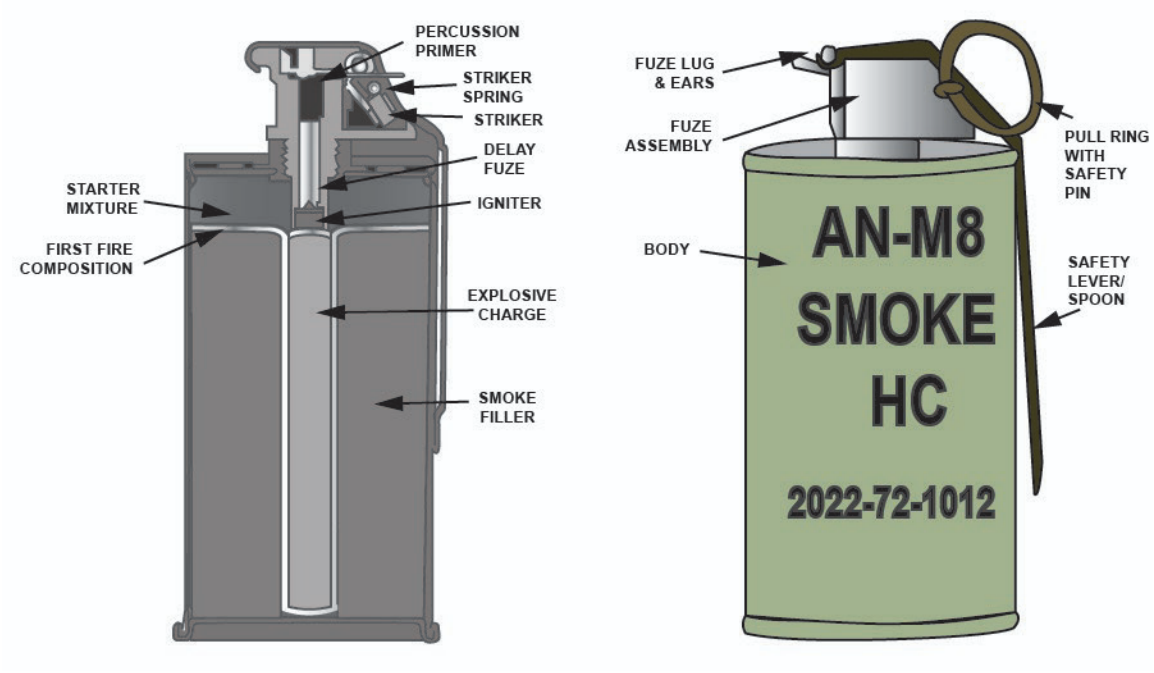
USMC Only

The MK-series smoke grenade is for USMC use only. It contains safety features that are specific to USMC, and only trained and certified personnel will employ the MK16 MOD 0, MK17 MOD 0, and MK19 MOD 0.

Legend: USMC – United States Marine Corps

Figure 3-39. MK-series smoke grenade for United States Marine Corps use

DODIC G930 w/ G874	*AN-M8 HC White Smoke Hand Grenade*
The AN-M8 HC white smoke hand grenade produces dense clouds of white smoke for screening small-unit activities and signaling. It emits the cloud of smoke for 105 to 150 seconds. The AN-M8 HC hand grenade produces harmful hydrochloric fumes that irritate the eyes, throat, and lungs.	



Functioning
Extracting the pull ring with the safety pin permits release of the safety lever. When the grenade is thrown, the striker assembly, through action of the spring, throws off the safety lever and impacts the percussion primer, which functions the primer charge. Once initiated, the delay composition and the igniter set off the explosive charge, allowing the smoke filler to produce effects of heavy smoke for 105 to 150 seconds.

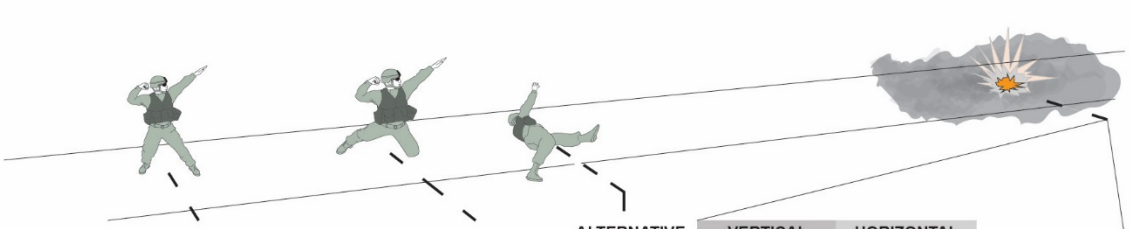
Components and Characteristics	*Details*
Nomenclature	Grenade, Hand, Smoke AN-M8 HC
NSN	1330-00-219-8511
Body/Colors and Markings	Sheet steel cylinder / light green body with black markings and white top
Total Weight	24.0 ounces
Filler	19.0 ounces of Type C, HC smoke mixture
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Pull ring w/ safety pin. • Safety lever.

Legend: DODIC – Department of Defense identification code, HC – hexachloroethane-zinc, NSN – national stock number, w/ – with

Figure 3-40. AN-M8 HC white smoke hand grenade

AN-M8 HC – DODIC G930	Average Throwing Distance and Marking Zone

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
AN-M8 HC	35M	25M	20M	N/A	3M	105-150 SEC
M83 TA	35M	25M	20M	1200M	15M	70-90 SEC
M106 SOD-VR	35M	25M	N/A	15M	15M	35 SEC

Employment

1. The AN-M8 is authorized for contingency operations only to—
   - Create an obscuration screen within a given area or location within 5 seconds of detonation.
   - Obscure or screen the movement of the tactical small unit in all operational environments.

Note. In training units should request and use only the M83 TA (see figure 3-42, page 3-52).

2. Safety considerations.
   - DO NOT use smoke hand grenades in enclosed or confined spaces. Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen.
   - AN-M8 smoke grenade should only be used for outdoor employment.
   - Do not use the AN-M8 smoke grenade within 50 feet of flammable materials.
   - Keep all body parts away from emission hole of grenade while smoke is produced.
   - Do not release safety lever and hold onto grenade to allow smoke to billow before employment “Pull Pin and Throw.”

WARNING: DO NOT "COOK OFF" OR "MILK” the grenade.

Legend: DODIC – Department of Defense identification code, HC – hexachloroethane-zinc, M – meters, N/A – not applicable, SEC – second, SOD-Vr – screening obscuration device-visual restricted, TA – terephthalic acid

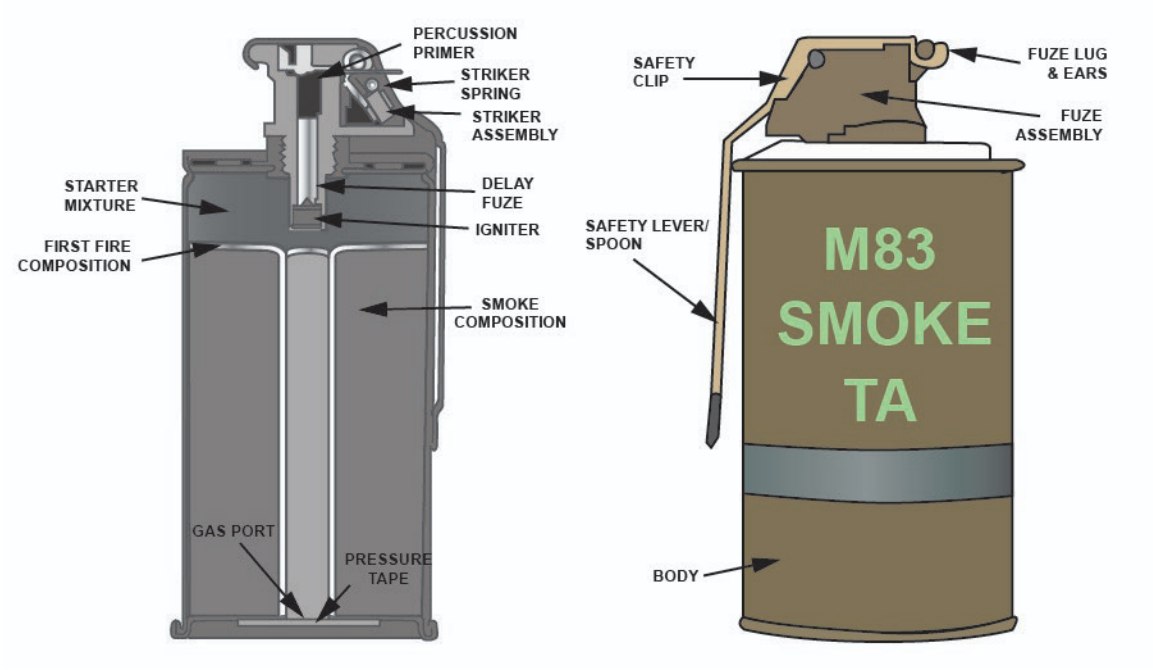
Figure 3-41. AN-M8 HC average throwing distance and marking zone

CAUTION

Damaged AN-M8 HC grenades that expose the filler are hazardous. Exposure of the filler to moisture and air could result in a chemical reaction that ignites the grenade.

The AN-M8 HC smoke hand grenade is restricted to outside the continental United States operational use only or until stockpile depletion. Units should request and use the M83 TA white smoke hand grenade for training and as an interim solution for tactical obscuration until a new tactical obscuration hand grenade is tested, approved, and fielded to replace the AN-M8 HC smoke hand grenade.

DODIC G982 w/ G874	*M83 TA White Smoke Hand Grenade*
Use the M83 TA white smoke hand grenade for screening and obscuring the activities of the tactical small units and for limited ground-to-ground and ground-to-air signaling. Although the M83 TA is not a member of the colored-smoke series of grenades, the Soldier can use it for limited signaling activities. Burning-type grenades burn oxygen; standard protective masks filter particles but DO NOT supply oxygen. Therefore, DO NOT use burning grenades in enclosed or confined spaces.	



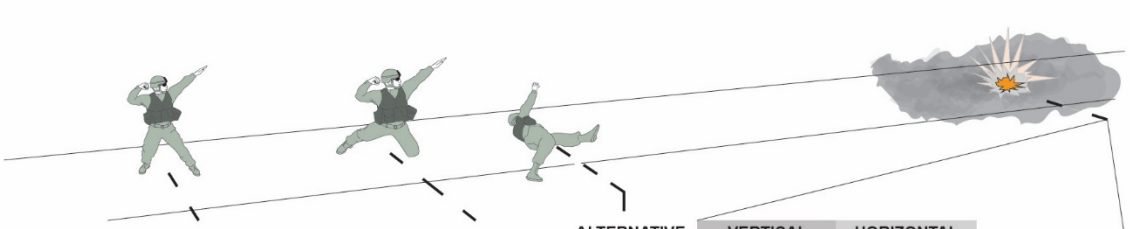
Functioning
Removing the pull ring with safety pin permits release of the safety lever. Releasing the safety lever forces it away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The fuze delay element initiates the starter patch, mixture, and filler. The pressure sensitive tape is blown off the emission hole at the bottom of the grenade, and smoke is emitted for 70 to 90 seconds from the bottom vent hole on the grenade.

Components and Characteristics	*Details*
Nomenclature	Grenade, Hand, Smoke M83 TA
NSN	1330-01-380-0284
Body/Colors and Markings	Cylinder of thin sheet metal, with one hole at the bottom / forest green body with light green markings, light green band, and a white top
Total Weight	17.6 ounces
Filler	11.0 ounces of TA
Fuze and Delay	M201A1 – 1.0 to 2.3 seconds
Safety Features	• Pull ring with safety pin. • Safety lever.
Legend: DODIC – Department of Defense identification code, NSN – national stock number, TA – terephthalic acid	

Figure 3-42. M83 TA white smoke hand grenade

M83 TA – DODIC G982	*Average Throwing Distance and Obscuration Zone*

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
AN-M8 HC	35M	25M	20M	N/A	3M	105-150 SEC
M83 TA	35M	25M	20M	1200M	15M	70-90 SEC
M106 SOD-VR	35M	25M	N/A	15M	15M	35 SEC

Employment

1. The M83 TA smoke grenade is approved for training and contingency operations worldwide to—
   - Create obscuration within a given area or location within 5 seconds of detonation.
   - Obscure or screen the movement of the tactical small unit in all operational environments.

Note. The AN-M8 HC smoke hand grenade is restricted to OCONUS contingency operations only. All units will request and use the M83 TA smoke hand grenade to support unit-training requirements.

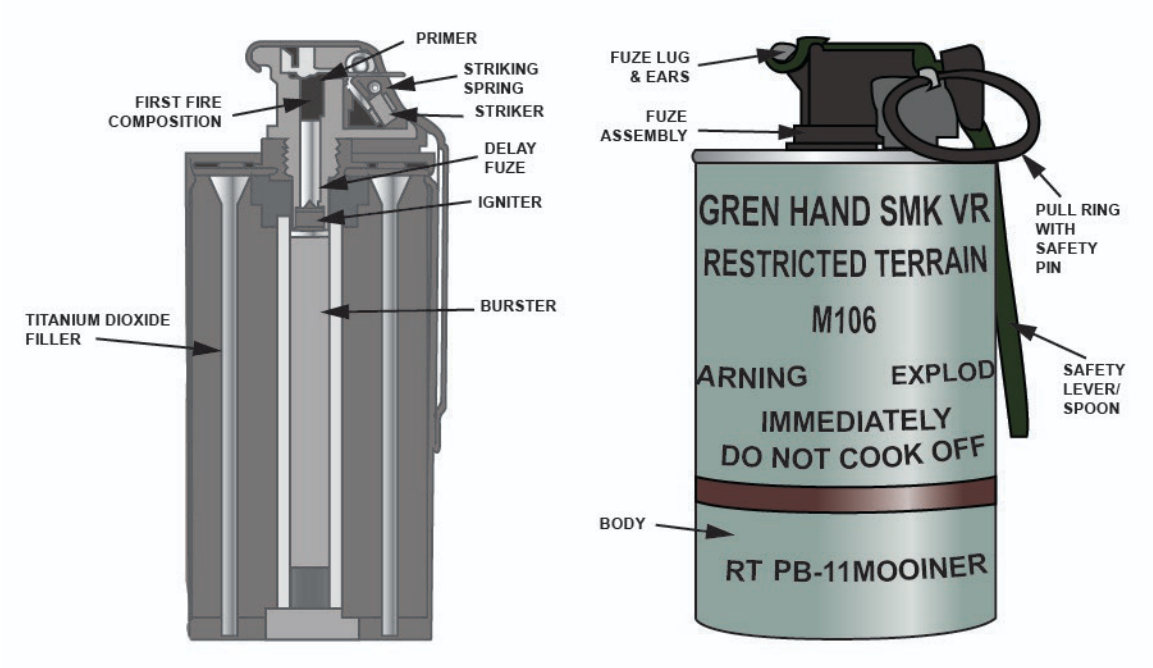
2. Safety considerations.
   - M83 TA smoke grenade should only be used for outdoor employment.
   - DO NOT use burning-type grenades in enclosed or confined spaces.
   - Do not use the M83 TA smoke grenade within 50 feet of flammable materials.
   - Keep all body parts away from emission hole of grenade while smoke is produced.
   - Do not release safety lever and hold onto grenade to allow smoke to billow before employment, “Pull Pin and Throw.”

WARNING: DO NOT "COOK OFF" OR "MILK” the grenade.

Legend: DODIC – Department of Defense identification code, HC – hexachloroethane-zinc, M – meters, N/A – not applicable, OCONUS – outside the continental United States, SEC – second, SOD-Vr – screening obscuration device-visual restricted, TA – terephthalic acid

Figure 3-43. M83 TA average throwing distance and obscuration zone

DODIC GG25	*M106 SOD-VR*
The M106 SOD-Vr provides a nearly instantaneous device. The grenade produces approximately 35 seconds of smoke to defeat the enemies' line of sight, in the visual through near IR spectrum. The M106 SOD-Vr is a bursting-type hand grenade that can be used in tandem with the AN-M8 HC or M83 TA smoke hand grenade for a long duration obscuration screen (for example, greater than 120 seconds of smoke). The screen is weather-dependent. Unit-level training is required before use and request of the M106 SOD-Vr.	



Functioning

The M201A1 MOD3 fuze pull ring is retained in a confidence clip, to prevent premature activation or becoming a snag hazard during movement. Soldiers must conduct confidence clip training before training with and employing the M106 SOD-Vr hand grenade. To prepare to arm the M106, the thrower must secure a proper grip on the grenade. Right-handed throwers insert their index or middle finger upward into the pull ring up to the second knuckle; left-handed throwers insert their index or middle finger downward into the pull ring up to the second knuckle and close the nonthrowing hand.

To disengage the pull ring from the confidence clip and arm the grenade for employment the Soldier or thrower will rotate the pull ring towards the body (right-handed throwers) or away from the body (left-handed throwers) until the pull ring disengages from the confidence clip, then extract the pull ring with safety pin while maintaining a firm grip on the grenade. Do NOT "cook off" or "milk" the safety lever before employing the grenade, the M106 SOD-Vr has a 1.0- to 2.3-second fuze delay. Prematurely cooking off and milking the safety lever after safety pin extraction may lead to serious injury to the hand, face, and eyes, or to death.

When the M106 is thrown, a striker acting under the force of a striker spring forces the safety lever away from the grenade body. The striker rotates on its axis and strikes the percussion primer. The primer initiates the first-fire mixture. The fuze delay element, ignition mixture, and pyrotechnic burster are initiated, in turn, by the preceding component. Rapidly expanding gases from the pyrotechnic burster fragment the fiberboard grenade body, disbursing the titanium dioxide payload as a dense white cloud.

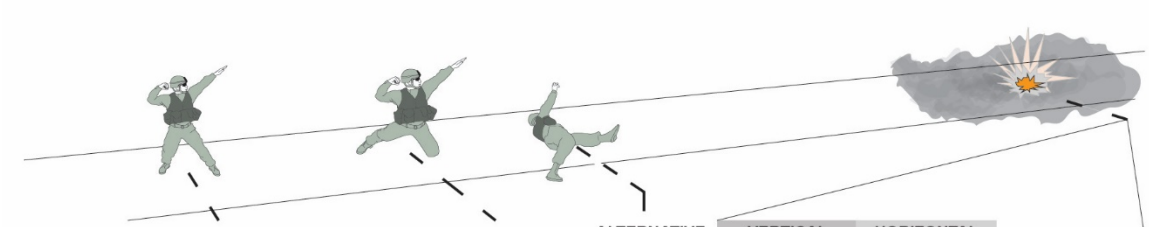
Figure 3-44. M106 SOD-VR

DODIC GG25	*M106 SOD-VR*
Components and Characteristics	***Details***
Nomenclature	Grenade, Hand, Smoke, Visual M106
NSN	1330-01-557-1954
Body/Colors and Markings	Mylar-coated fiberboard canister tube / light green body with black markings and warning, a brown band indicating a low-order explosive and an orange safety label; fuze is olive drab with black markings
Total Weight	20.7 ounces
Filler	9 ounces nontoxic, noncombustible, environmentally safe titanium dioxide
Fuze and Delay	M201A1 MOD 3 – 1.0 to 2.3 seconds
Safety Features	• Pull ring with safety pin. • Safety lever.
Legend: DODIC – Department of Defense identification code, HC – hexachloroethane-zinc, IR – infrared, NSN – national stock number, SOD-Vr – screening obscuration device – visual restricted terrain, TA – terephthalic acid	

Figure 3-44. M106 SOD-VR (continued)

M106 SOD-Vr – DODIC GG25	*Average Throwing Distance and Obscuration Zone*

Smoke Grenades and Signals



MODEL	STANDING	KNEELING	ALTERNATIVE PRONE	VERTICAL RANGE	HORIZONTAL RANGE	DURATION
AN-M8 HC	35M	25M	20M	N/A	3M	105-150 SEC
M83 TA	35M	25M	20M	1200M	15M	70-90 SEC
M106 SOD-VR	35M	25M	N/A	15M	15M	35 SEC

Employment

1. The M106 can—
   - Produce approximately 35 seconds of near instantaneous obscuration smoke as a sniper defeat capability.
   - Used to break the enemy line of sight to allow freedom of movement, to extract wounded, or egress kill zone.
   - Used in tandem with the burning-type smoke hand grenade (for example, AN-M8 HC and M83 TA) for a long duration 90 to 125 seconds smoke obscuration screen to obscure the tactical small unit.
   - The M106 SOD-Vr will NOT be employed in buildings or structures that friendly forces will be employed.
2. Safety considerations.
   - Refer to the M106 SOD-Vr GTA card in each M2A2 metal can before handling or employing the M106 SOD-Vr “bursting” smoke hand grenade for proper gripping and arming procedures, PCCs and PCIs.
   - Before employing the M106, ensure the designated point of detonation is clear of obstacles before employment.
   - Ensure the thrower is trained on the pull ring disengagement of the confidence clip before employment.

WARNING: DO NOT "COOK OFF" OR "MILK" the grenade.

   - Do not release the safety lever (for example, “cook off” or “milk” the grenade or switch hands after the safety pin is extracted).

Legend: DODIC – Department of Defense identification code, GTA – graphic training aid, HC – hexachloroethane-zinc, M – meters, N/A – not applicable, PCC – precombat check, PCI – precombat inspection, SEC – second, SOD-Vr – screening obscuration device – visual restricted terrain, TA – terephthalic acid

Figure 3-45. M106 average throwing distance and obscuration zone

3-26. The filler forms a dense, obscurant cloud within 1.0 to 2.3 seconds after deployment. Weather effects may cause the M106 to dissipate more quickly.

3-27. Inside of a building, the heavy particles of the M106 may linger in the air for 2 to 4 minutes. Gas masks must be donned.

WARNING

Before employing the M106, the thrower must ensure the grenades flight path is clear of obstacles and that all friendly forces are at least 15 meters away from the point of detonation. DO NOT attempt to “cook off,” “milk,” or switch hands after safety pin extraction.

The M106 SOD-Vr will NOT be employed inside buildings and structures friendly forces will be operating.

Do not release the safety lever (for example, "cook off" or "milk” the grenade or switch hands after the safety pin is extracted).

HAND GRENADE USE

3-28. While hand grenades vary widely by type, use, and effects, Soldiers generally employ them in the same fashion. Soldiers must demonstrate and execute the proper techniques of gripping, preparing (for example, removing the safety clip [if present], disengaging the pull ring from the confidence clip [if present], and extracting the pull ring with the safety pin) before throwing the grenade. For clarity, all figures will refer to the M69 training practice grenade. The methods and procedures are the same, regardless of the grenade type.

GRIPPING

3-29. A grenade not held properly is difficult to arm. Gripping procedures differ slightly for right- and left-handed Soldiers; proper grip remains constant. Holding the grenade in the throwing hand with the safety lever placed between the first and second joints of the thumb provides safety and throwing efficiency.

3-30. Apply enough grip pressure to maintain the grenade body without causing unnecessary strain to the thrower. The pressure applied is similar to a firm handshake. (See figure 3-46.)

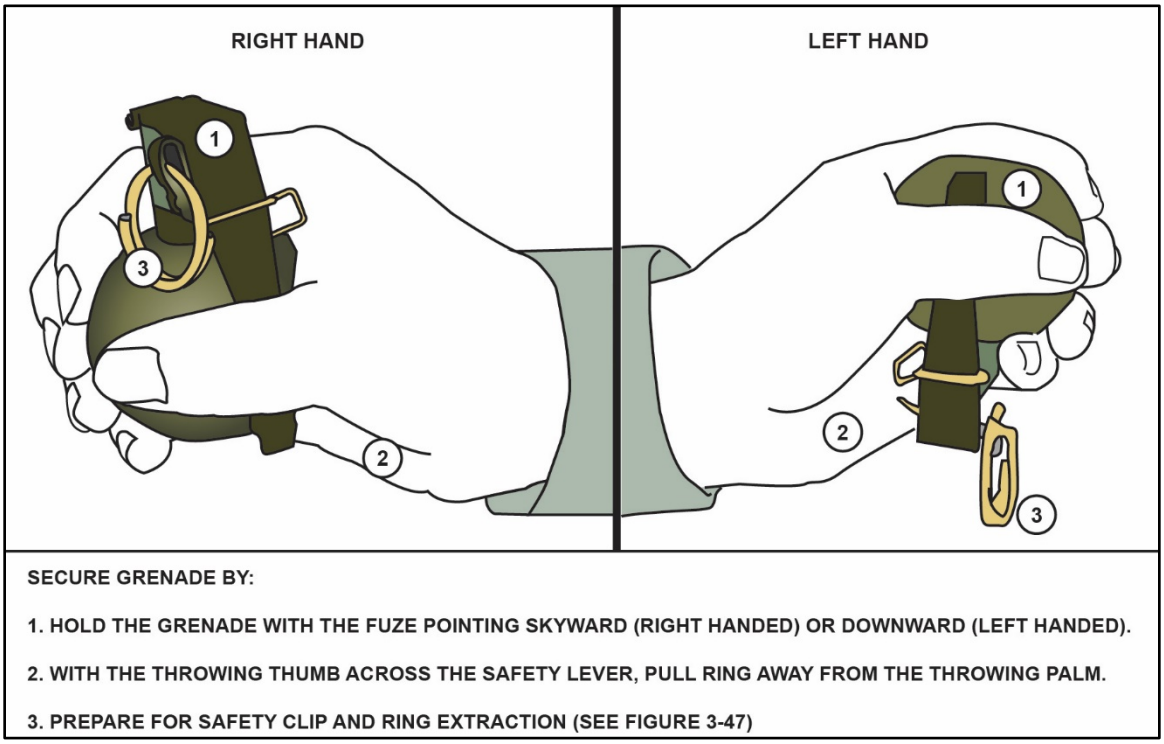

RIGHT HAND
LEFT HAND
1
2
3
1
2
3
SECURE GRENADE BY:
1. HOLD THE GRENADE WITH THE FUZE POINTING SKYWARD (RIGHT HANDED) OR DOWNWARD (LEFT HANDED).
2. WITH THE THROWING THUMB ACROSS THE SAFETY LEVER, PULL RING AWAY FROM THE THROWING PALM.
3. PREPARE FOR SAFETY CLIP AND RING EXTRACTION (SEE FIGURE 3-47)

Figure 3-46. Right-hand grip and left-hand grip

PREPARING

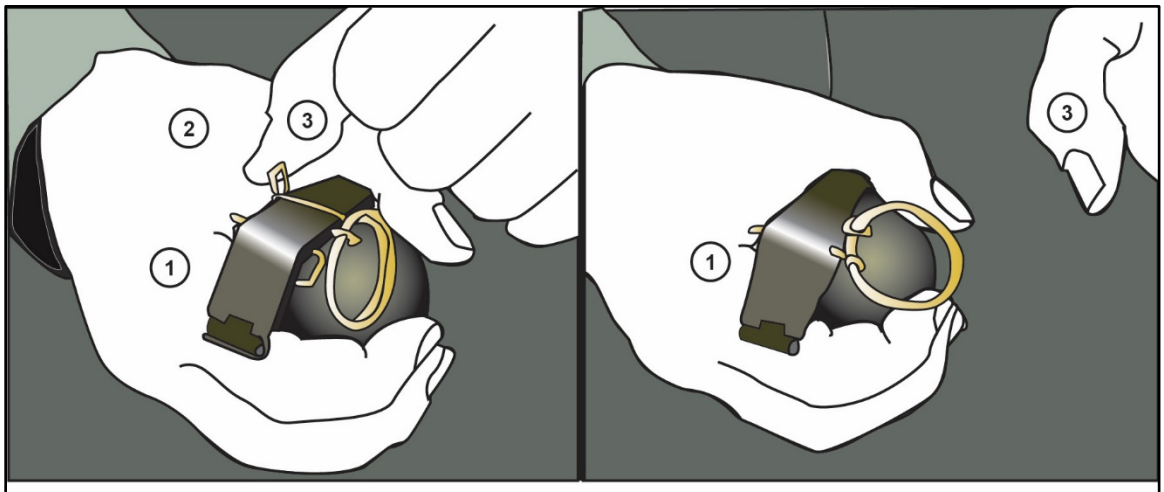
3-31. Preparing procedures differ slightly for right- and left-handed Soldiers. Before preparing the grenade, the Soldier must maintain a proper grip on the body of the grenade with the throwing hand; grip remains constant. (See figures 3-47 through 3-50, pages 3-59 through 3-61).

3-32. The Soldier's nonthrowing hand will sweep away the safety clip and secure the pull ring for removal. If a confidence clip is attached, the Soldier must first turn/twist the pull ring 90 degree towards the body for right-handed throwers and away from the body for left-handed throwers until the pull ring disengages from the confidence clip before removing it.

Note. DO NOT remove the safety clip or the safety pin until the grenade is about to be thrown.

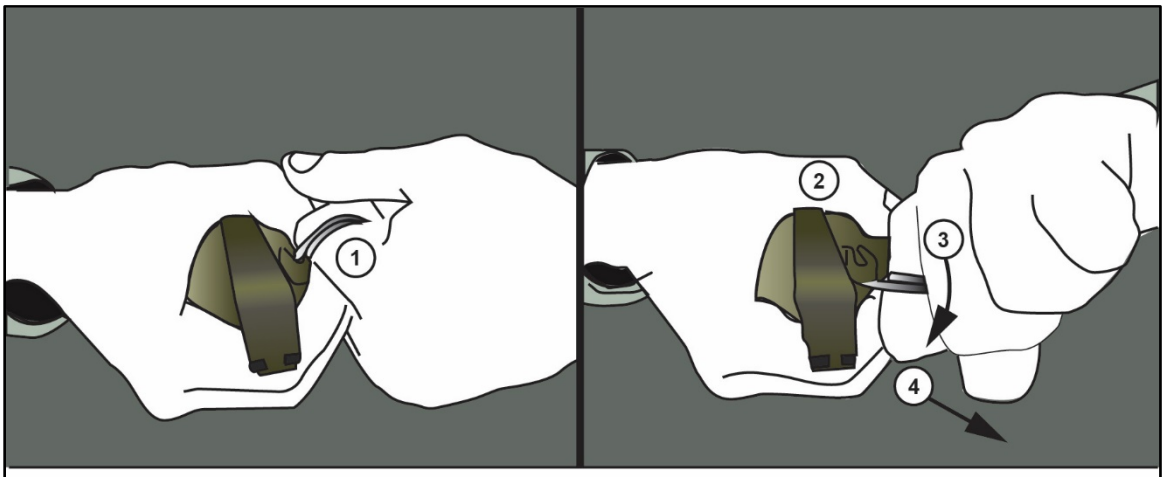
CAUTION

Never attempt to reinsert a safety or pull pin into any type of hand grenade. Attempting to reinsert the safety/pull pin can lead to inadvertent functioning of the hand grenade, resulting in wounding or killing the Soldier and/or damaging equipment.



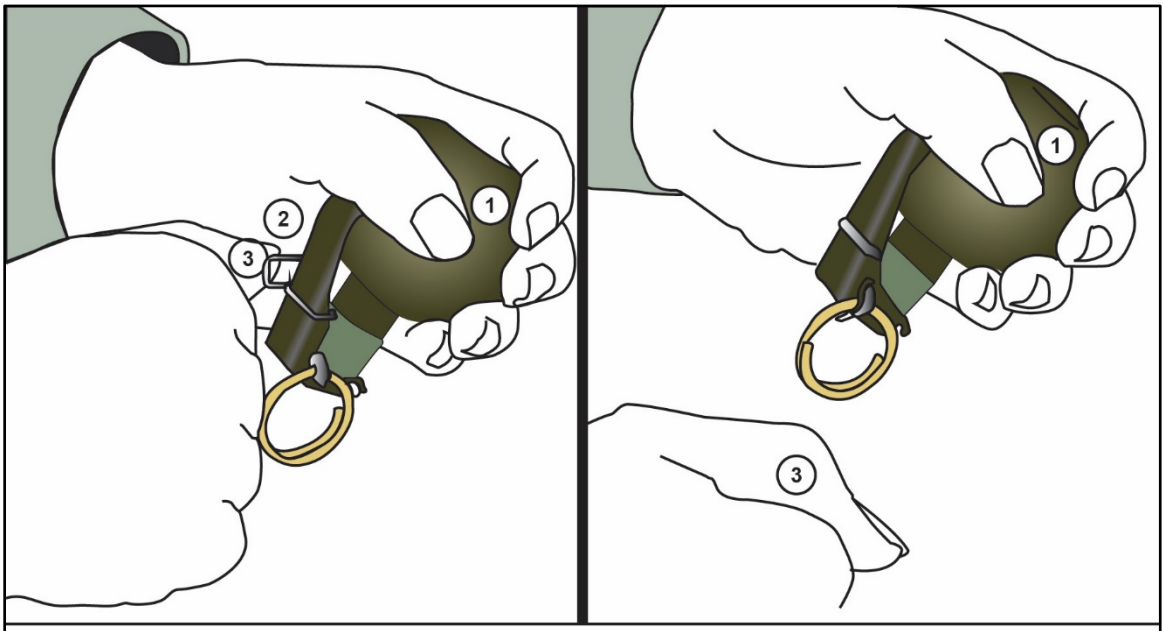
1. HOLD THE GRENADE WITH THE PROPER RIGHT-HAND GRIP SO THAT THE SAFETY LEVER IS HELD DOWN FIRMLY.
2. TILT THE GRENADE FORWARD TO OBSERVE THE SAFETY CLIP.
3. REMOVE THE SAFETY CLIP BY SWEEPING IT AWAY FROM THE GRENADE WITH THE THUMB OF THE NONTHROWING HAND.

Figure 3-47. Right-hand grip removing the safety clip



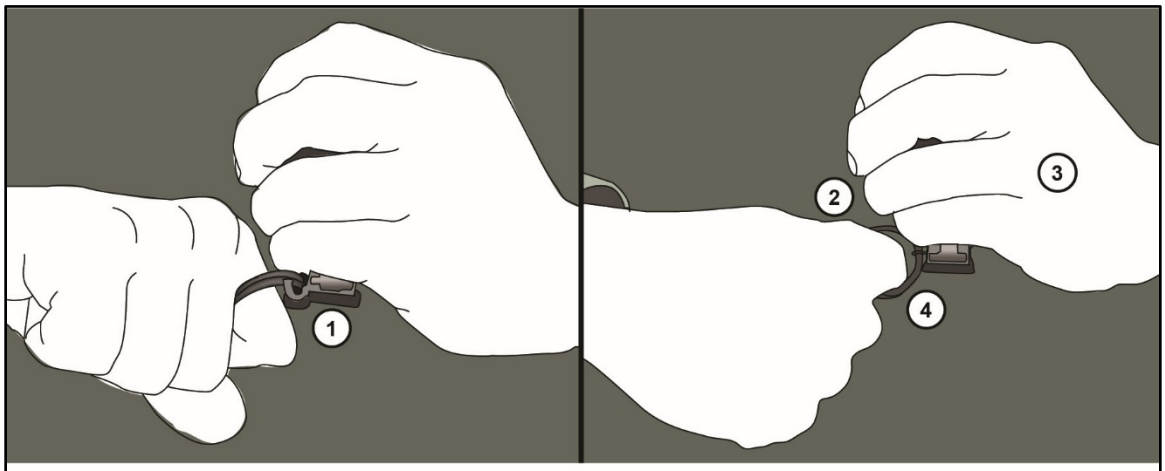
1. SECURE PROPER RIGHT-HAND GRIP.
2. REMOVE SAFETY CLIP.
3. INSERT INDEX OR MIDDLE FINGER UPWARD INTO THE PULL RING, THEN TURN/TWIST THE PULL RING TOWARDS THE BODY TO DISENGAGE FROM THE CONFIDENCE CLIP, THEN STOP.
4. WITH THE INDEX OR MIDDLE FINGER IN THE PULL RING, EXTRACT THE PULL RING WITH PULL PIN ASSEMBLY STRAIGHT OUT OF THE GRENADE.
5. EMPLOY GRENADE.
6. SEEK COVER UNTIL DETONATION.

Figure 3-48. Right-hand grip removing the pull ring



1. HOLD THE GRENADE WITH THE PROPER LEFT-HAND GRIP SO THAT THE SAFETY LEVER IS HELD DOWN FIRMLY.
2. TILT THE GRENADE FORWARD TO OBSERVE THE SAFETY CLIP.
3. REMOVE THE SAFETY CLIP BY SWEEPING IT AWAY FROM THE GRENADE WITH THE THUMB OF THE NONTHROWING HAND.

Figure 3-49. Left-hand grip removing the safety clip



1. SECURE PROPER LEFT-HAND GRIP.
2. REMOVE SAFETY CLIP.
3. INSERT INDEX OR MIDDLE FINGER DOWNWARD INTO THE PULL RING, THEN TURN/TWIST THE PULL RING AWAY FROM THE BODY TO DISENGAGE FROM THE CONFIDENCE CLIP, THEN STOP.
4. WITH THE INDEX OR MIDDLE FINGER IN THE PULL RING, EXTRACT THE PULL RING WITH PULL PIN ASSEMBLY STRAIGHT OUT OF THE GRENADE.
5. EMPLOY GRENADE.
6. SEEK COVER UNTIL DETONATION.

Figure 3-50. Left-hand grip removing the pull ring

DANGER

If pressure on the safety lever is relaxed after the safety clip and safety pin are removed, the striker can rotate and strike the primer while the thrower is still holding the grenade. Continuing to hold the grenade beyond this point can result in injury or death.

COOKING OFF

3-33. To achieve aboveground or near-impact detonation—

- Remove the safety clip.
- Disengage pull ring from confidence clip (if equipped).
- Remove the grenade's pull ring with safety pin.
- Release the safety lever.
- Count "one thousand one, one thousand two."
- Throw the grenade with high arc.
- Seek cover until detonation.

3-34. This is commonly referred to as cooking off. Cooking off or using enough of the grenade's 4- to 5-second delay (about 2 seconds) causes the grenade to detonate sooner after thrown. Using some of the fuze delay time causes the grenade to detonate aboveground or shortly after impact with the target. Figure 3-51, page 3-63, outlines fuze settings.

MILKING

3-35. Milking describes the action Soldiers use when moving their fingers or their thumb while holding a hand grenade after removing the safety and pull ring. When Soldiers move their fingers or thumb after they have pulled the pin, the risk of dropping or arming the munition before the intended time increases. Milking is an unintentional act of releasing pressure on the safety lever ($^1/_8$ inch or ¼ pounds of pressure), causing the striker to rotate on its axis, striking the primer, and detonating the munition.

WARNINGS

In training, never cook off live fragmentation hand grenades. Use the cook-off procedure only with grenades that have a fuze setting of 4 seconds or greater in a combat environment.

Never attempt to "cook off" or "milk" the M106 SOD-Vr, the M84 stun grenade (flashbang), the M18, M83, M14 or any other type of smoke or special-purpose grenade that has a 1.0- to 2.3-second delay fuze.

Attempting to "cook off" or "milk" exploding-, bursting-, or burning-type hand grenades can lead to death and/or serious injury to personnel and damage to unit equipment.

Grenade Fuze Delay Settings		
Grenade Type	***Fuze Delay***	***Cook Off Yes/No***
M69 TPG with M228 TPF	4.0 to 5.5 seconds	Yes (2.0 seconds)
M112 POHG with M228 TPF	4.0 to 5.5 seconds	Yes (2.0 seconds)
M102 practice stun hand grenade with M240 pyrotechnic fuze	1.0 to 2.3 seconds	No
M67 fragmentation hand grenade	4.0 to 5.5 seconds	Yes (2.0 seconds) Refer to note 1 below
*MK3A2 offensive hand grenade with M201A1 or M206A2 fuze	4.0 to 5.5 seconds	Yes (2.0 seconds) Refer to note 1 below
M111 OHG	4.0 to 5.5 seconds	Yes (2.0 seconds) Refer to note 1 below
M84 nonlethal stun hand grenade	1.0 to 2.3 seconds	No
M104 nonlethal bursting hand grenade	1.2 to 3.1 seconds	No
M18 smoke hand grenade (signal) (green, yellow, red, violet)	1.0 to 2.3 seconds	No
MK16 MOD 0 hand grenade smoke (yellow) with internal fuze	2.0 (+/- 0.5) seconds	No
MK17 MOD 0 hand grenade smoke (green) with internal fuze	2.0 (+/- 0.5) seconds	No
MK19 MOD 0 hand grenade smoke (white) with internal fuze	2.0 (+/- 0.5) seconds	No
*AN-M8 HC smoke hand grenade	1.0 to 2.3 seconds	No
M84 TA smoke hand grenade	1.0 to 2.3 seconds	No
M106 SOD-Vr (Bursting)	1.0 to 2.3 seconds	No
M14 TH3 incendiary hand grenade	1.0 to 2.3 seconds	No
M7A2 & M7A3 CS riot control hand grenade	1.0 to 2.3 seconds	No
ABC-M25A2 C1 riot control hand grenade	1.4 to 3.0 seconds	No
M47 CS riot control hand grenade	2.5 to 3.5 seconds	No
Note 1: "Cook off" technique is only for 2 seconds. The Soldier or thrower will release pressure off the safety lever and count "one thousand one, one thousand two," then immediately employ the grenade. *Indicates hand grenades that are restricted to contingency or OCONUS operation use only and are being phased out and replaced.		
Legend: CS – tear gas, HC – hexachloroethane-zinc, OCONUS – outside the continental United States, OHG – offensive hand grenade, POHG – practice offensive hand grenade, SOD-Vr – screening obscuration device–visual restricted terrain, TA – terephthalic acid, TH3 – thermate, TPF – training practice fuze, TPG – training practice grenade		

Figure 3-51. Grenade fuze delay settings

WARNING

Time-delay setting may vary and fuzes may function before prescribed times listed above. DO NOT "COOK OFF or "MILK" the safety lever after pull ring with safety pin extraction. This action can lead to premature detonation of the grenade leading to severe injury, death, or damage to unit equipment.

THROWING

3-36. Tactical employment of the hand grenade is mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC) dependent. The situation dictates the position best suited for delivering a grenade on target. Soldiers can use five positions to throw grenades:

- Standing.
- Prone-to-standing.
- Kneeling.
- Prone-to-kneeling.
- Alternate prone.

3-37. If Soldiers can achieve more distance and accuracy safely using their own personal style, allowing them to do so is acceptable, provided their bodies are facing sideways and toward the enemy's position and they throw the grenade overhand. There are, however, general steps that Soldiers must follow:

- Observe the target to estimate the distance between the throwing position and the target area.

Note. In observing the target, minimize exposure time to the enemy (no more than 3 seconds).

To avoid interference with throwing techniques, Soldiers must ensure their primary weapons system is slung or maintained so it does not affect the flight path of the grenade.

- Grip the hand grenade in the right- or left-throwing hand.
- Prepare the hand grenade.
- Throw the grenade overhand so the grenade arcs, landing on or near the target.
- Allow the motion of the throwing arm to continue naturally after releasing the grenade.

Note. This follow-through improves distance and accuracy and lessens the strain on the throwing arm.

- Seek cover to avoid fragments or direct enemy fire. If no cover is available, drop to the prone position with your protective headgear facing the direction of the grenade's detonation.

Note. Soldiers should practice additional throws used in combat, such as the underhand and sidearm throws. Soldiers can practice these throws with practice grenades, but they must throw live fragmentation grenades overhand in a training environment.

WARNING

Throwers must consider the grenade's flight path to ensure no obstacles alter the flight of the grenade or cause it to bounce back toward them.

STANDING POSITION

3-38. The standing position is the most desirable and natural position to throw grenades (see figures 3-52 through 3-55, pages 3-66 through 3-68). It allows the Soldier to obtain the greatest possible throwing distance. However, this position should only be used when cover and concealment are readily available.

1. OBSERVE THE TARGET TO ESTIMATE THE DISTANCE BETWEEN THE THROWING POSITION AND THE TARGET AREA.
2. ASSUME A NATURAL STANCE WITH WEIGHT BALANCED EQUALLY ON BOTH FEET.
3. HOLD THE GRENADE AT CHEST LEVEL (WORKING AREA).
4. PREPARE THE GRENADE.

Figure 3-52. Standing position

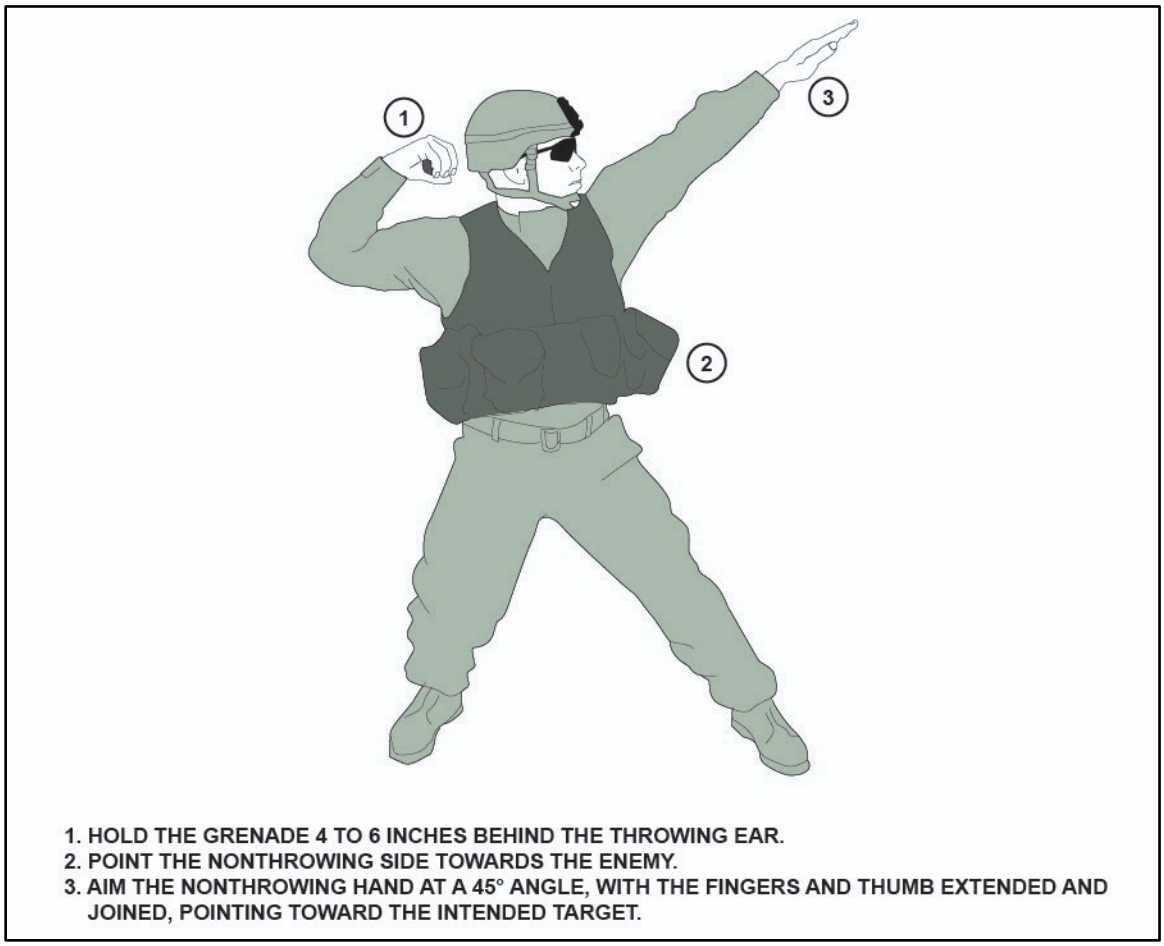

1
2
3
1. HOLD THE GRENADE 4 TO 6 INCHES BEHIND THE THROWING EAR.
2. POINT THE NONTHROWING SIDE TOWARDS THE ENEMY.
3. AIM THE NONTHROWING HAND AT A 45° ANGLE, WITH THE FINGERS AND THUMB EXTENDED AND JOINED, POINTING TOWARD THE INTENDED TARGET.

Figure 3-53. Standing position (continued)

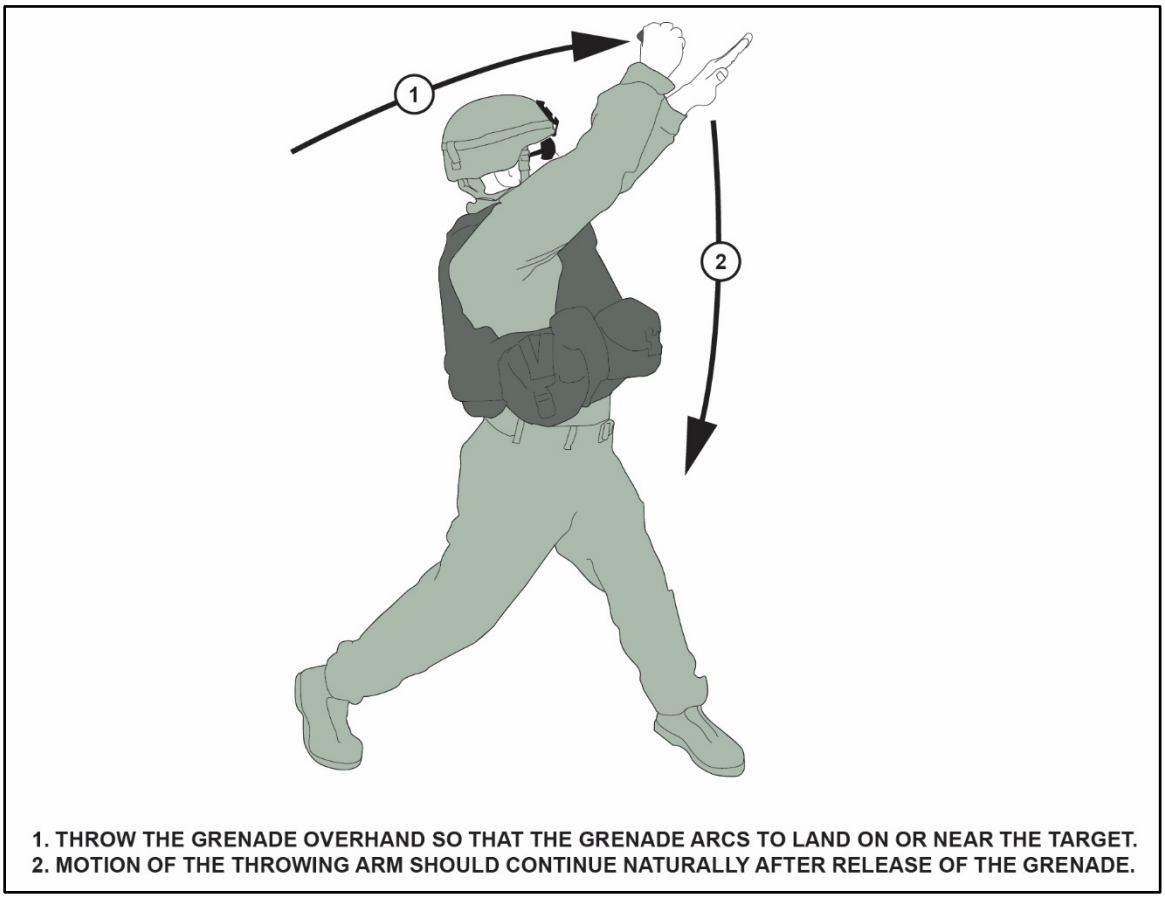

1
2
1. THROW THE GRENADE OVERHAND SO THAT THE GRENADE ARCS TO LAND ON OR NEAR THE TARGET.
2. MOTION OF THE THROWING ARM SHOULD CONTINUE NATURALLY AFTER RELEASE OF THE GRENADE.

Figure 3-54. Standing position (continued)

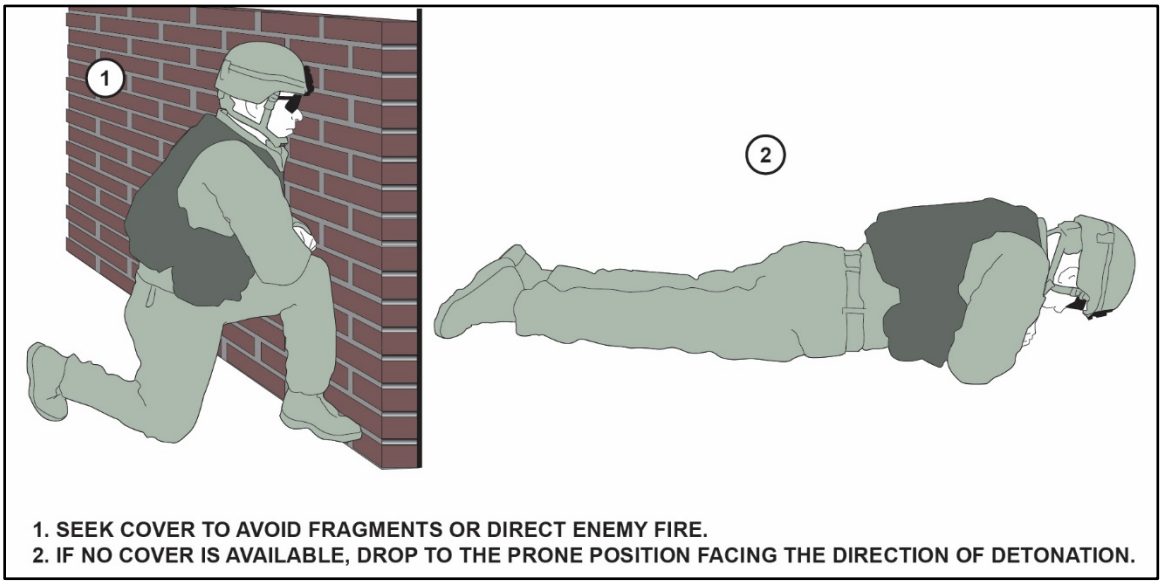

1
2
1. SEEK COVER TO AVOID FRAGMENTS OR DIRECT ENEMY FIRE.
2. IF NO COVER IS AVAILABLE, DROP TO THE PRONE POSITION FACING THE DIRECTION OF DETONATION.

Figure 3-55. Standing position (continued)

PRONE-TO-STANDING POSITION

3-39. Use the prone-to-standing position to immediately suppress an area, when exposure time is more important than accuracy, and when cover and concealment are not readily available. See figures 3-56 through 3-60 on pages 3-69 through 3-72.

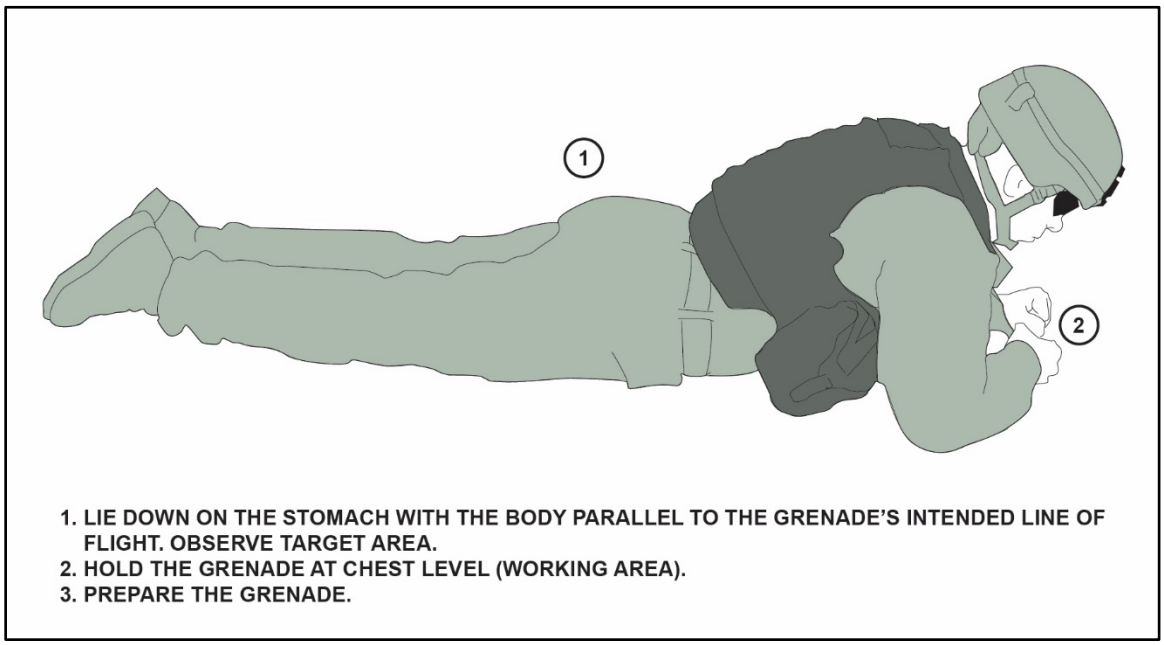

1
2
1. LIE DOWN ON THE STOMACH WITH THE BODY PARALLEL TO THE GRENADE'S INTENDED LINE OF FLIGHT. OBSERVE TARGET AREA.
2. HOLD THE GRENADE AT CHEST LEVEL (WORKING AREA).
3. PREPARE THE GRENADE.

Figure 3-56. Prone-to-standing position

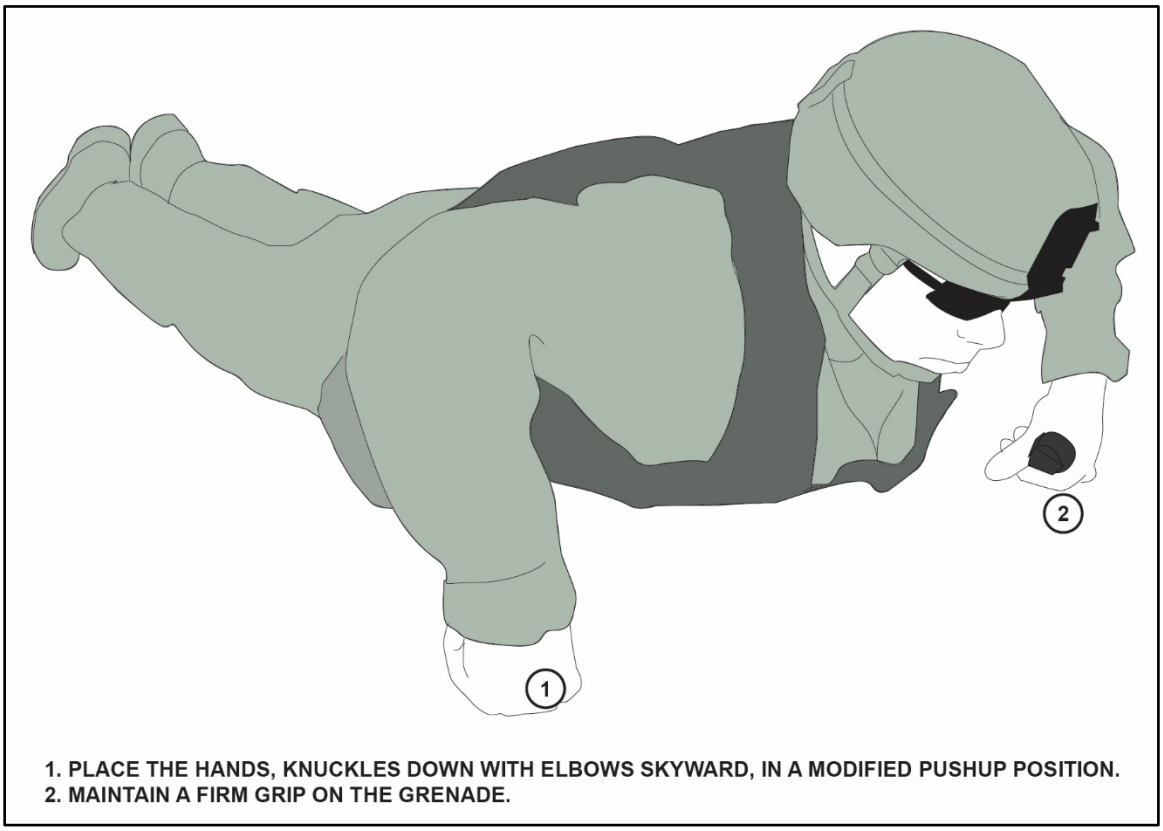

2
1
1. PLACE THE HANDS, KNUCKLES DOWN WITH ELBOWS SKYWARD, IN A MODIFIED PUSHUP POSITION.
2. MAINTAIN A FIRM GRIP ON THE GRENADE.

Figure 3-57. Prone-to-standing position (continued)

1. STAND UP WHILE HOLDING THE GRENADE IN THE THROWING HAND. ASSUME A GOOD STANDING POSITION, IF THE SITUATION PERMITS.
2. HOLD THE GRENADE 4 TO 6 INCHES BEHIND THE THROWING EAR.
3. POINT THE NONTHROWING SIDE TOWARD THE ENEMY.
4. AIM THE NONTHROWING HAND AT A 45° ANGLE, THE FINGERS AND THUMB EXTENDED AND JOINED, POINTING TOWARD THE INTENDED TARGET.

Figure 3-58. Prone-to-standing position (continued)

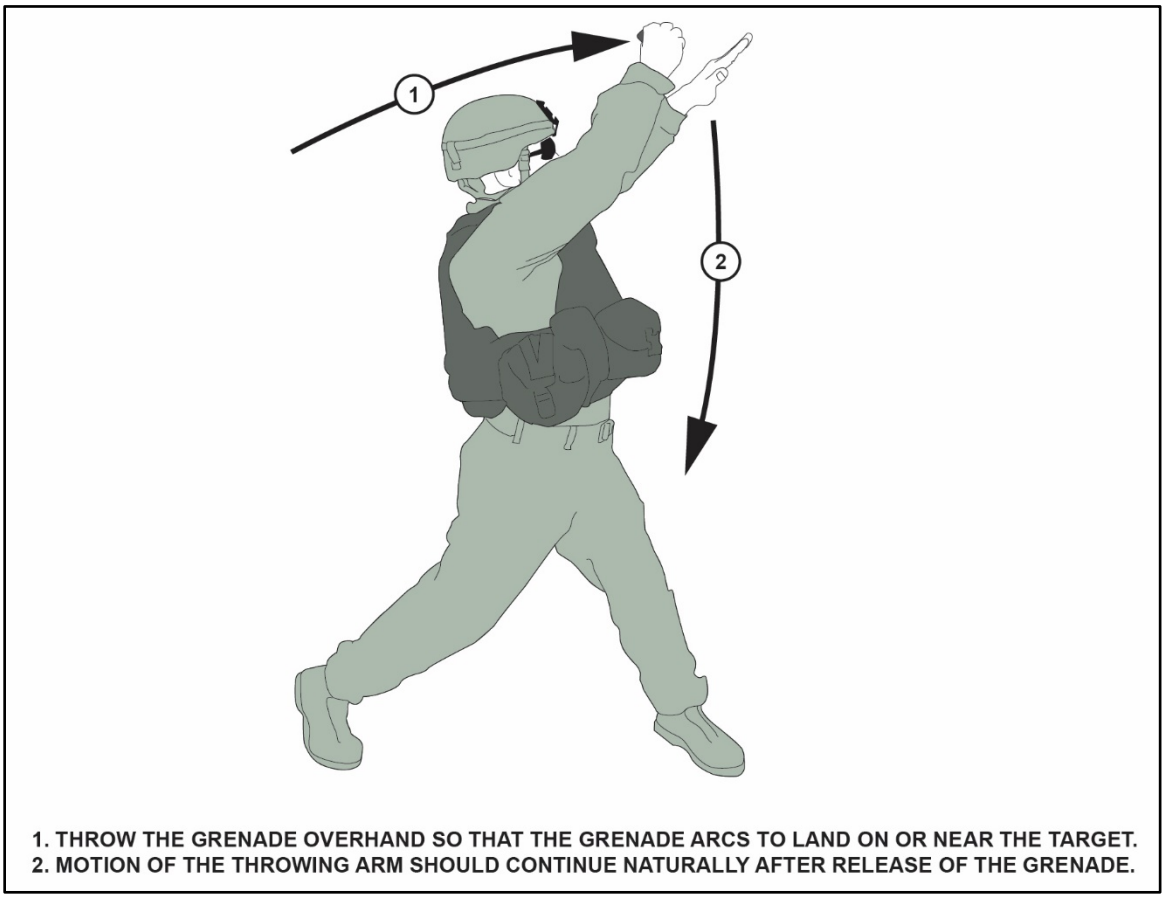

1
2
1. THROW THE GRENADE OVERHAND SO THAT THE GRENADE ARCS TO LAND ON OR NEAR THE TARGET.
2. MOTION OF THE THROWING ARM SHOULD CONTINUE NATURALLY AFTER RELEASE OF THE GRENADE.

Figure 3-59. Prone-to-standing position (continued)

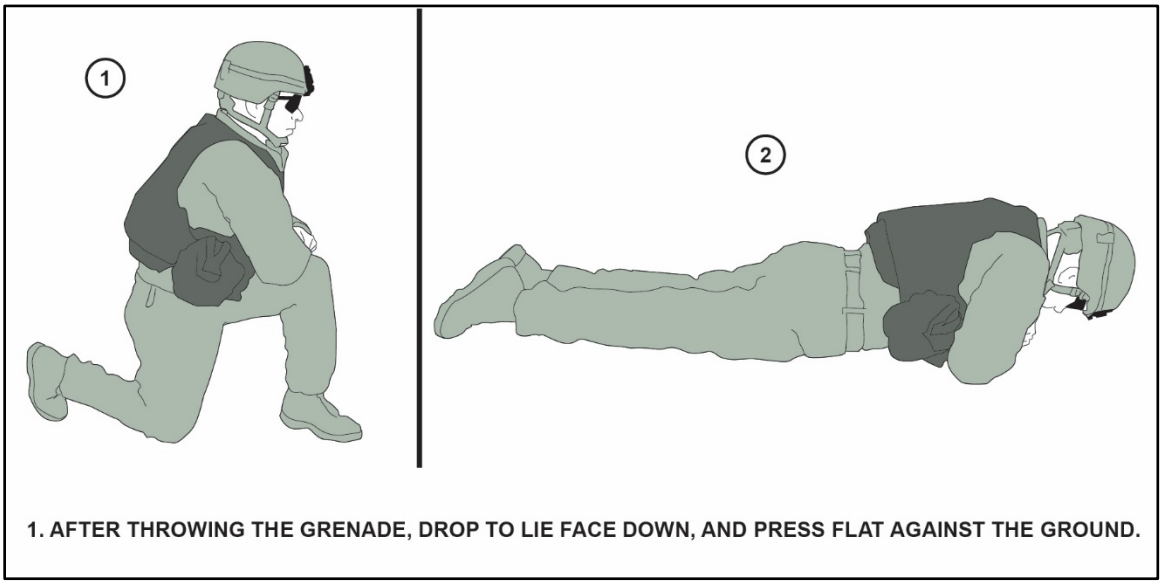


Figure 3-60. Prone-to-standing position (continued)

KNEELING POSITION

3-40. The kneeling position reduces the distance a Soldier can throw a grenade (see figures 3-61 through 3-64, pages 3-73 and 3-75). Use this position primarily from behind low-level ground cover.

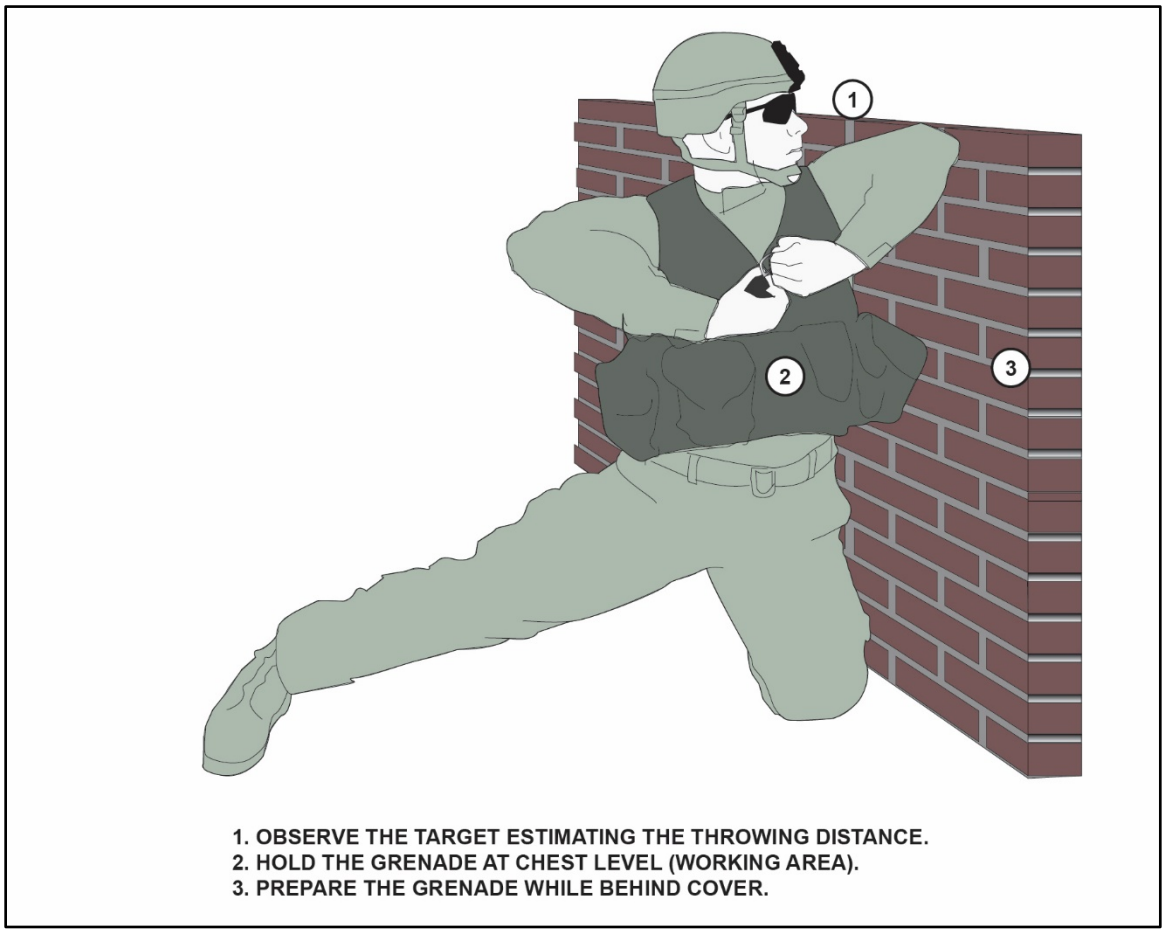

1
2
3
1. OBSERVE THE TARGET ESTIMATING THE THROWING DISTANCE.
2. HOLD THE GRENADE AT CHEST LEVEL (WORKING AREA).
3. PREPARE THE GRENADE WHILE BEHIND COVER.

Figure 3-61. Kneeling position

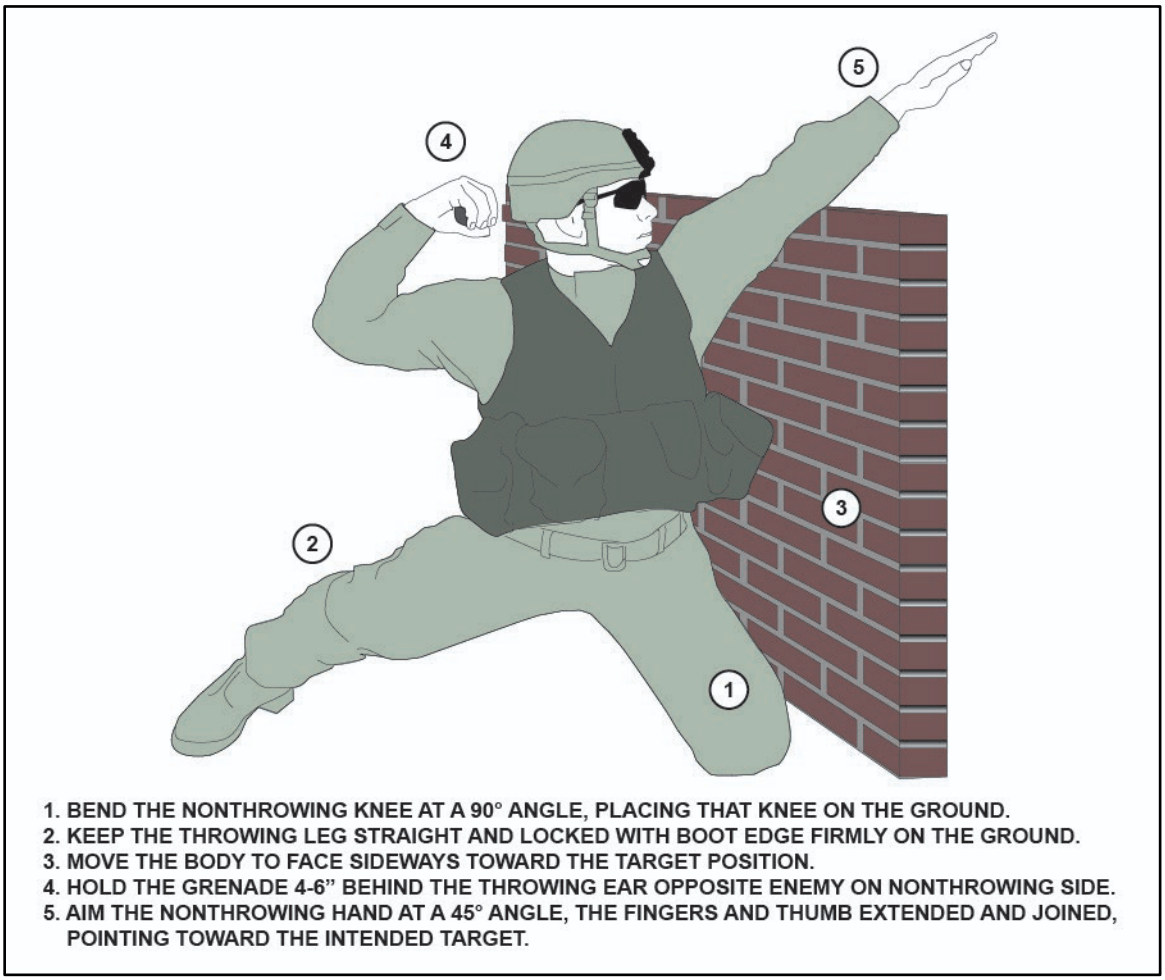

5
4
3
2
1
1. BEND THE NONTHROWING KNEE AT A 90° ANGLE, PLACING THAT KNEE ON THE GROUND.
2. KEEP THE THROWING LEG STRAIGHT AND LOCKED WITH BOOT EDGE FIRMLY ON THE GROUND.
3. MOVE THE BODY TO FACE SIDEWAYS TOWARD THE TARGET POSITION.
4. HOLD THE GRENADE 4-6" BEHIND THE THROWING EAR OPPOSITE ENEMY ON NONTHROWING SIDE.
5. AIM THE NONTHROWING HAND AT A 45° ANGLE, THE FINGERS AND THUMB EXTENDED AND JOINED, POINTING TOWARD THE INTENDED TARGET.

Figure 3-62. Kneeling position (continued)

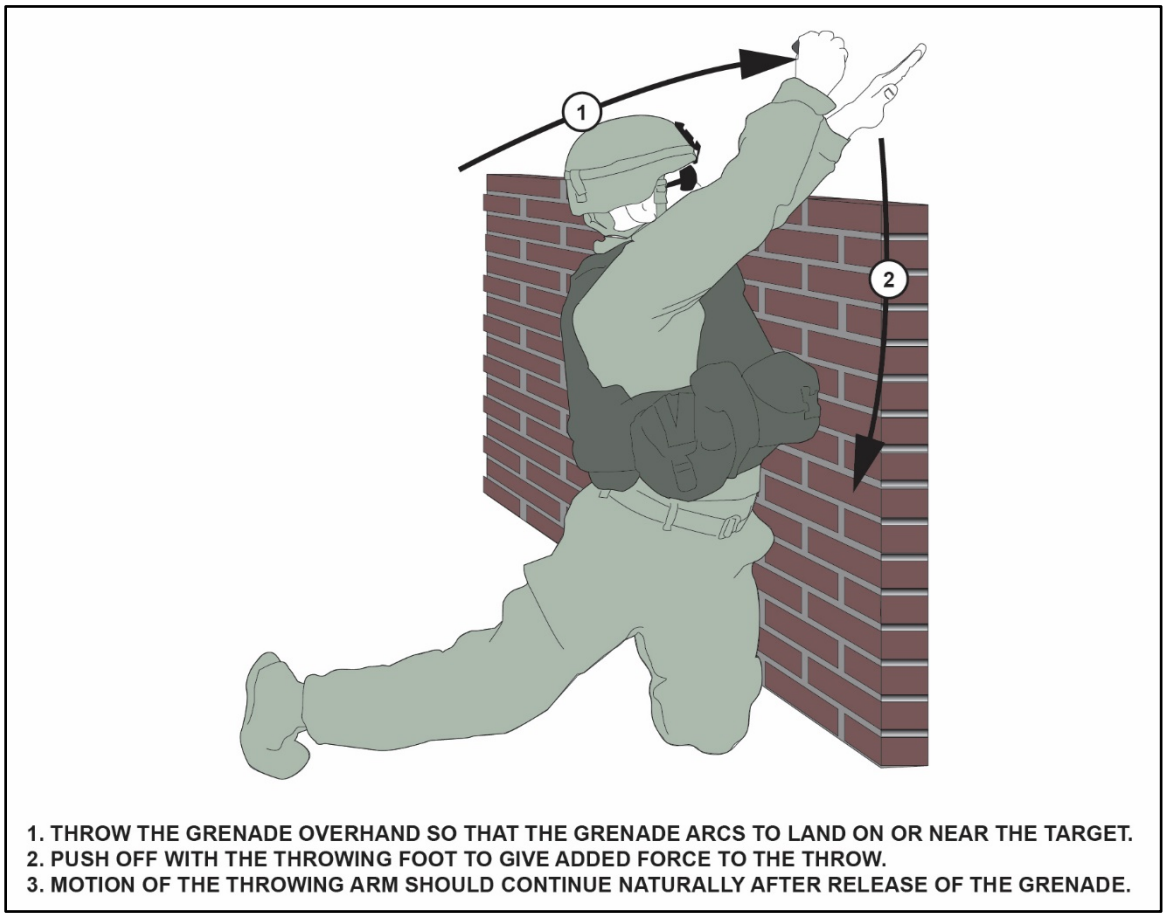

1
2
1. THROW THE GRENADE OVERHAND SO THAT THE GRENADE ARCS TO LAND ON OR NEAR THE TARGET.
2. PUSH OFF WITH THE THROWING FOOT TO GIVE ADDED FORCE TO THE THROW.
3. MOTION OF THE THROWING ARM SHOULD CONTINUE NATURALLY AFTER RELEASE OF THE GRENADE.

Figure 3-63. Kneeling position (continued)

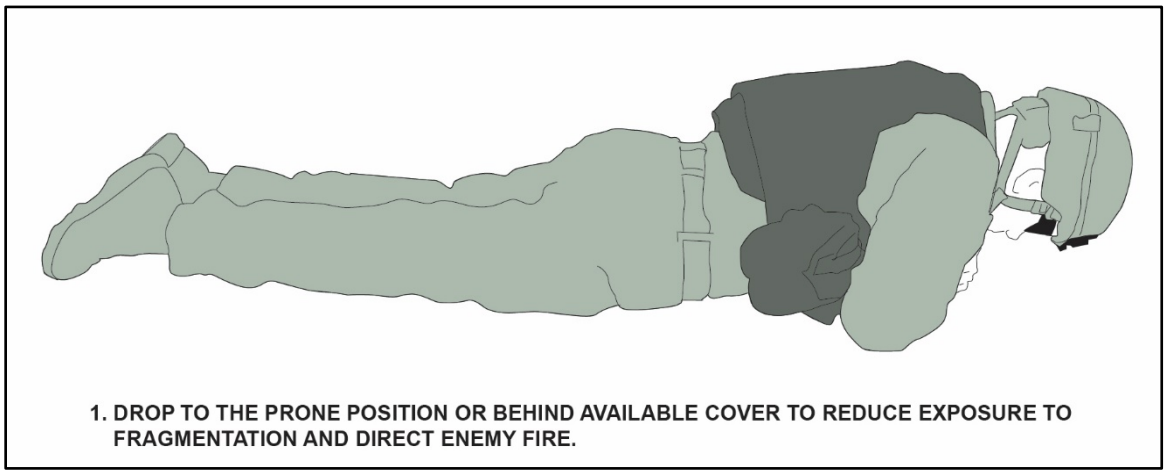


Figure 3-64. Kneeling position (continued)

PRONE-TO-KNEELING POSITION

3-41. The prone-to-kneeling position reduces the distance the Soldier can throw the grenade. The position is primarily used when a Soldier has only a low wall, a shallow ditch, or similar cover as protection. See figures 3-65 through 3-70, pages 3-76 through 3-79.

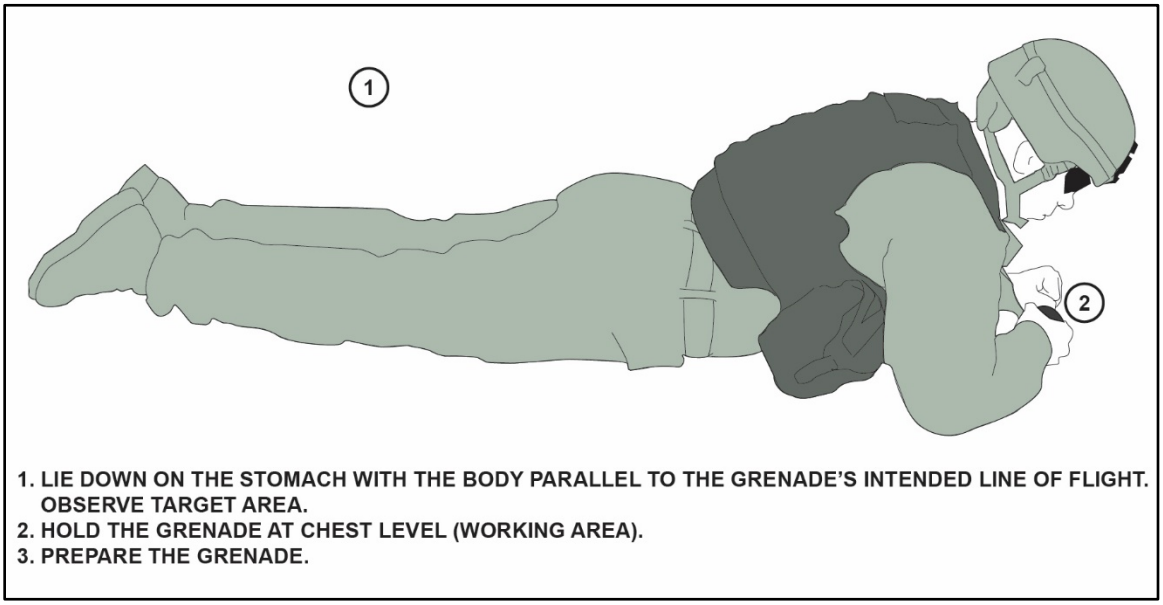

1
2
1. LIE DOWN ON THE STOMACH WITH THE BODY PARALLEL TO THE GRENADE'S INTENDED LINE OF FLIGHT. OBSERVE TARGET AREA.
2. HOLD THE GRENADE AT CHEST LEVEL (WORKING AREA).
3. PREPARE THE GRENADE.

Figure 3-65. Prone-to-kneeling position

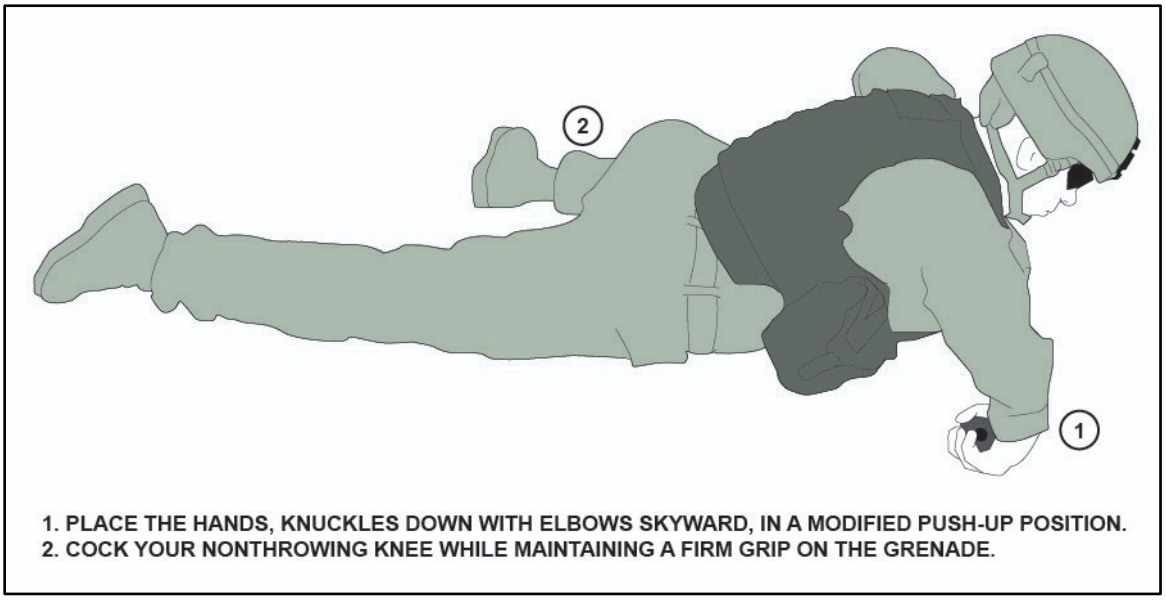
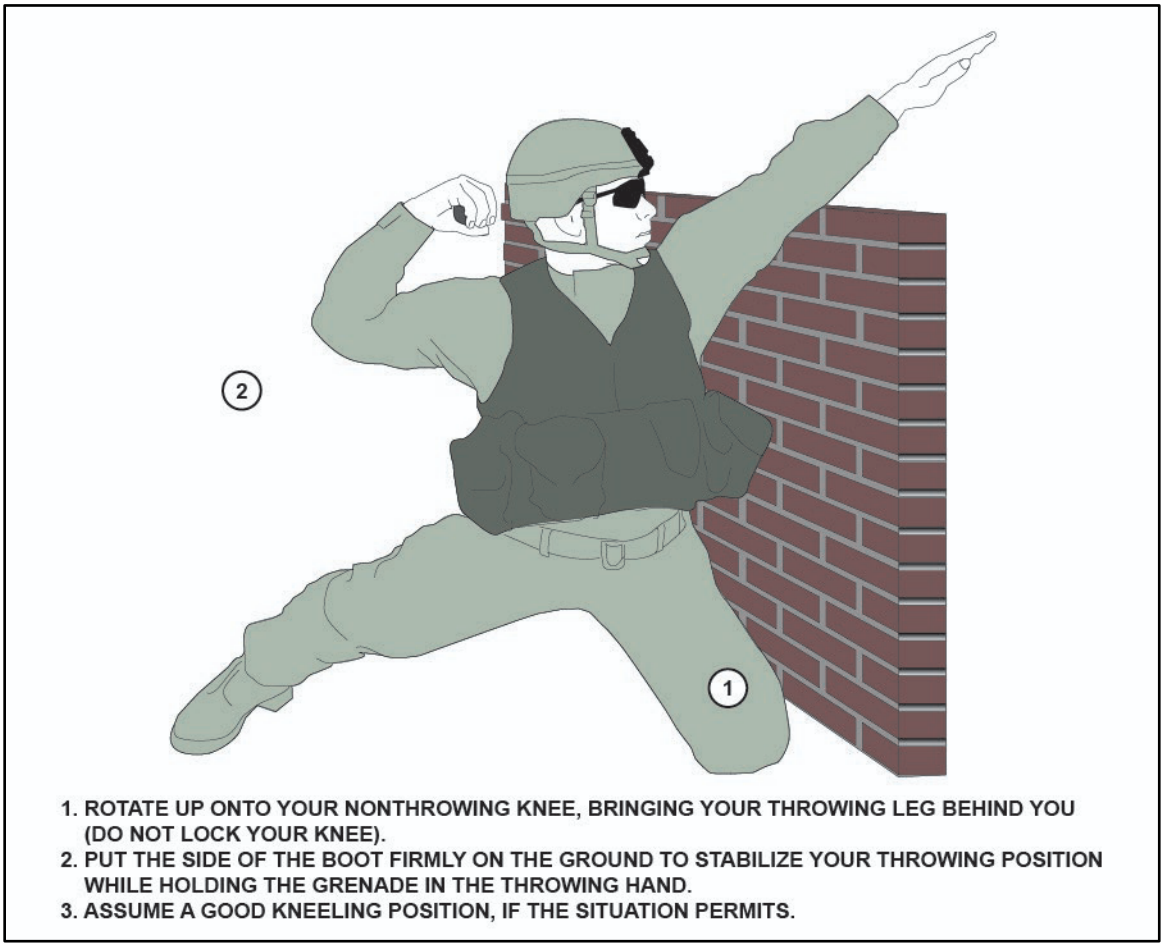

2
1
1. PLACE THE HANDS, KNUCKLES DOWN WITH ELBOWS SKYWARD, IN A MODIFIED PUSH-UP POSITION.
2. COCK YOUR NONTHROWING KNEE WHILE MAINTAINING A FIRM GRIP ON THE GRENADE.

Figure 3-66. Prone to kneeling position (continued)



1. ROTATE UP ONTO YOUR NONTHROWING KNEE, BRINGING YOUR THROWING LEG BEHIND YOU (DO NOT LOCK YOUR KNEE).
2. PUT THE SIDE OF THE BOOT FIRMLY ON THE GROUND TO STABILIZE YOUR THROWING POSITION WHILE HOLDING THE GRENADE IN THE THROWING HAND.
3. ASSUME A GOOD KNEELING POSITION, IF THE SITUATION PERMITS.

Figure 3-67. Prone-to-kneeling position (continued)

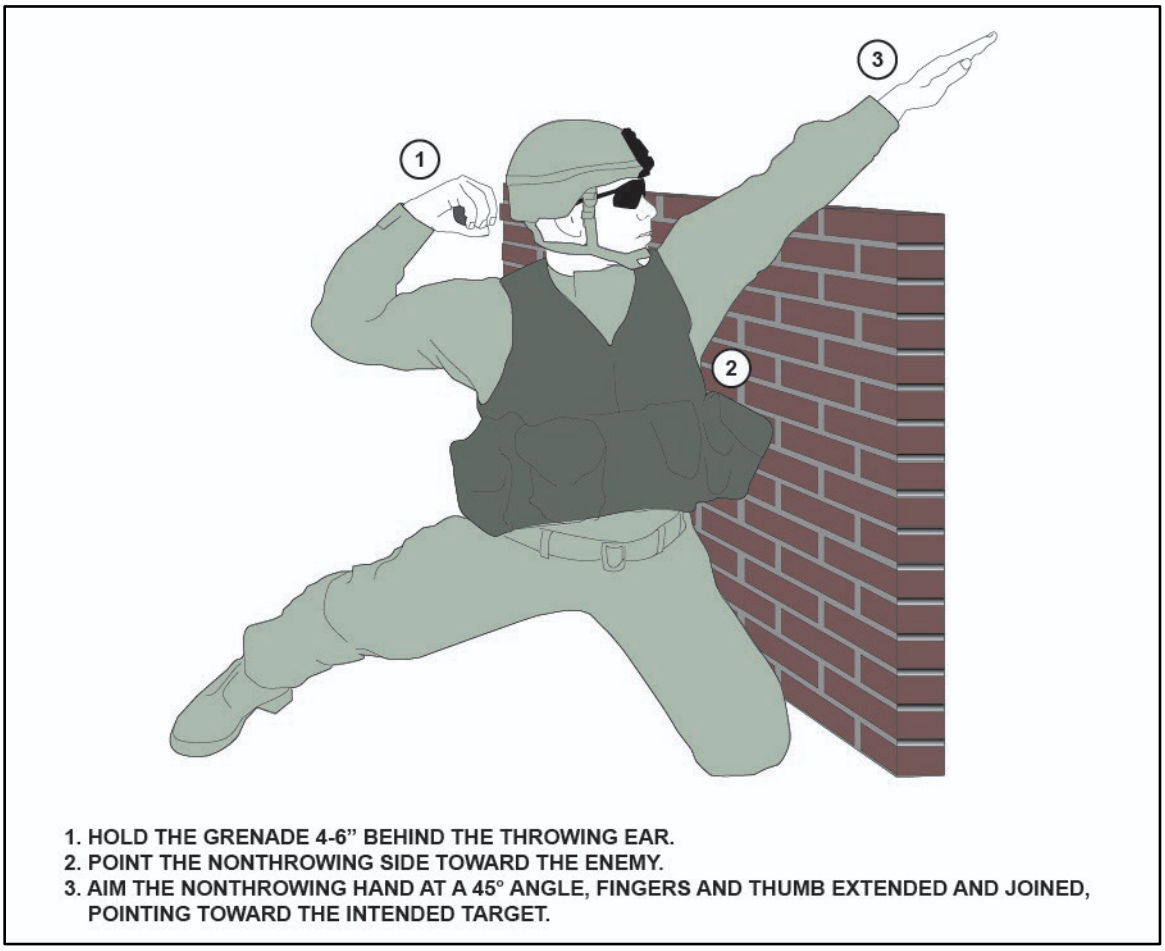

3
1
2
1. HOLD THE GRENADE 4-6" BEHIND THE THROWING EAR.
2. POINT THE NONTHROWING SIDE TOWARD THE ENEMY.
3. AIM THE NONTHROWING HAND AT A 45° ANGLE, FINGERS AND THUMB EXTENDED AND JOINED, POINTING TOWARD THE INTENDED TARGET.

Figure 3-68. Prone-to-kneeling position (continued)

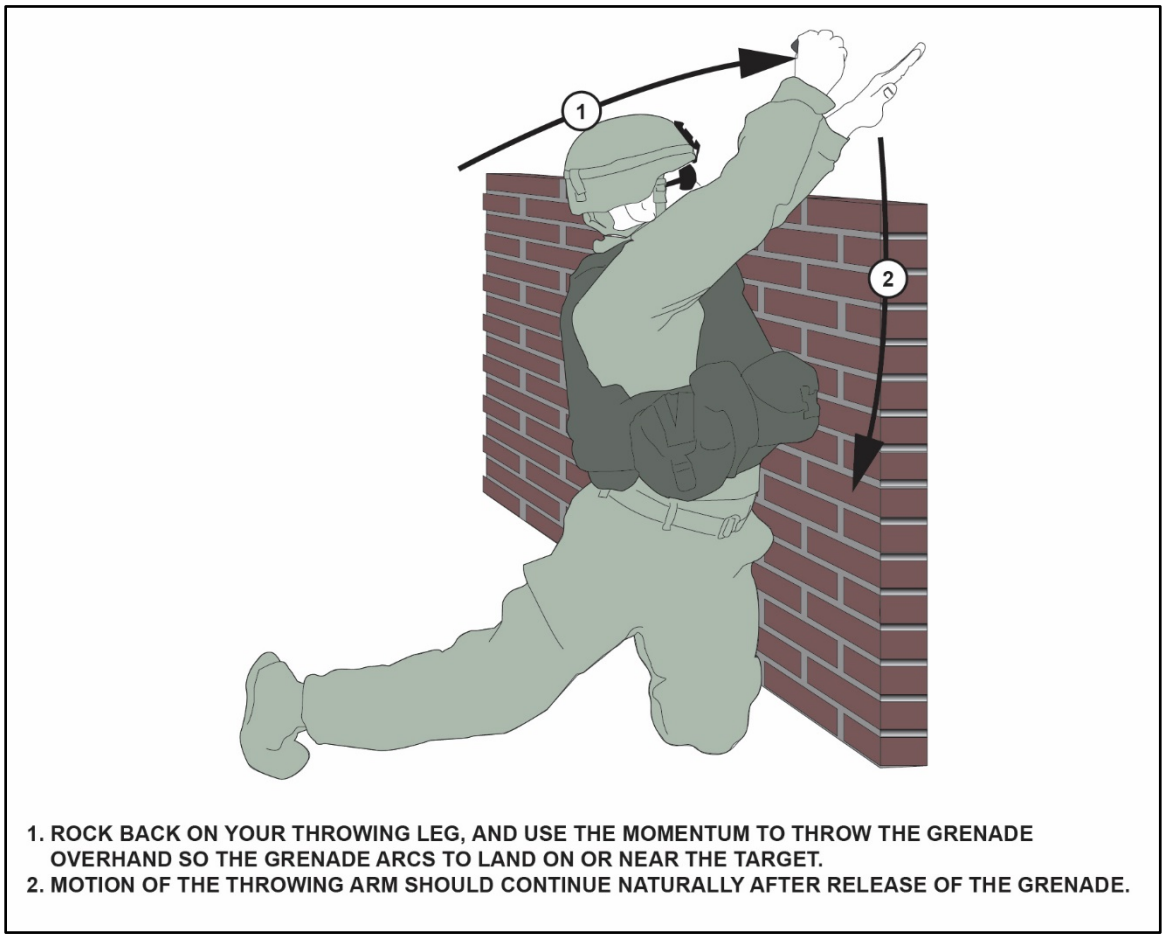

1
2
1. ROCK BACK ON YOUR THROWING LEG, AND USE THE MOMENTUM TO THROW THE GRENADE OVERHAND SO THE GRENADE ARCS TO LAND ON OR NEAR THE TARGET.
2. MOTION OF THE THROWING ARM SHOULD CONTINUE NATURALLY AFTER RELEASE OF THE GRENADE.

Figure 3-69. Prone-to-kneeling position (continued)

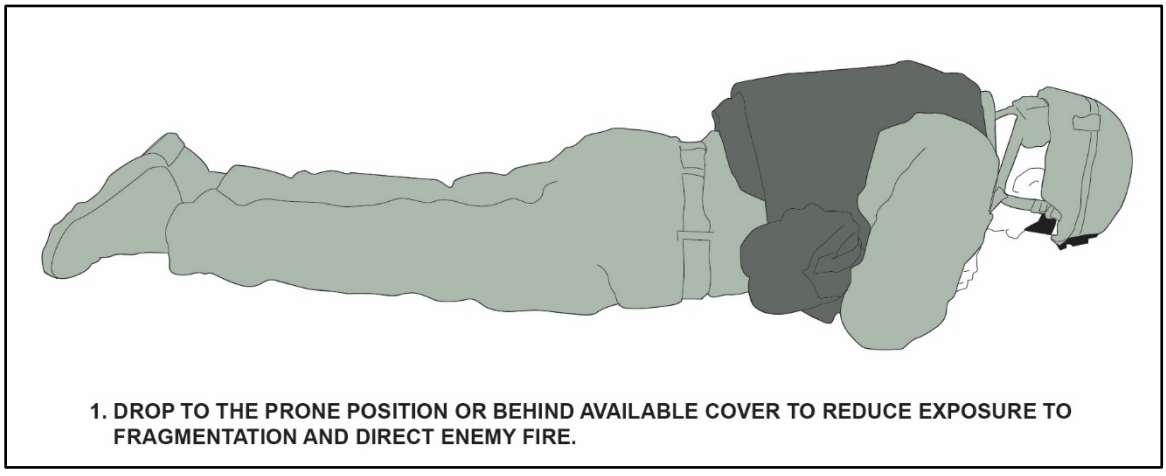


Figure 3-70. Prone-to-kneeling position (continued)

ALTERNATE PRONE POSITION

3-42. The alternate prone position reduces both distance and accuracy (see figures 3-71 through 3-74, pages 3-80 and 3-81). Use this position when cover is limited and rising to engage a target would expose the Soldier to direct fire.

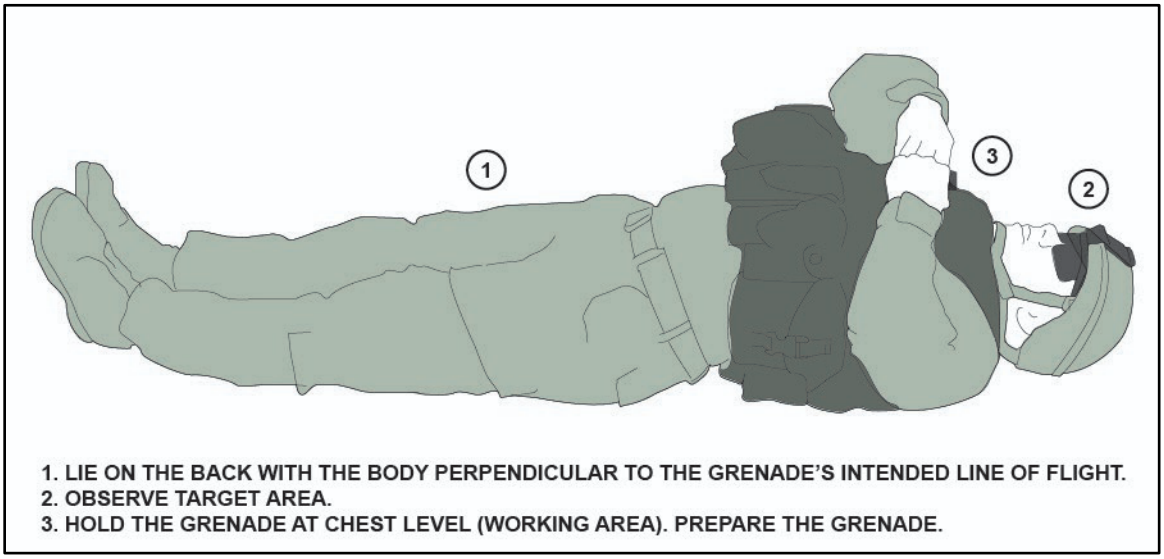

1
3
2
1. LIE ON THE BACK WITH THE BODY PERPENDICULAR TO THE GRENADE'S INTENDED LINE OF FLIGHT.
2. OBSERVE TARGET AREA.
3. HOLD THE GRENADE AT CHEST LEVEL (WORKING AREA). PREPARE THE GRENADE.

Figure 3-71. Alternate prone position

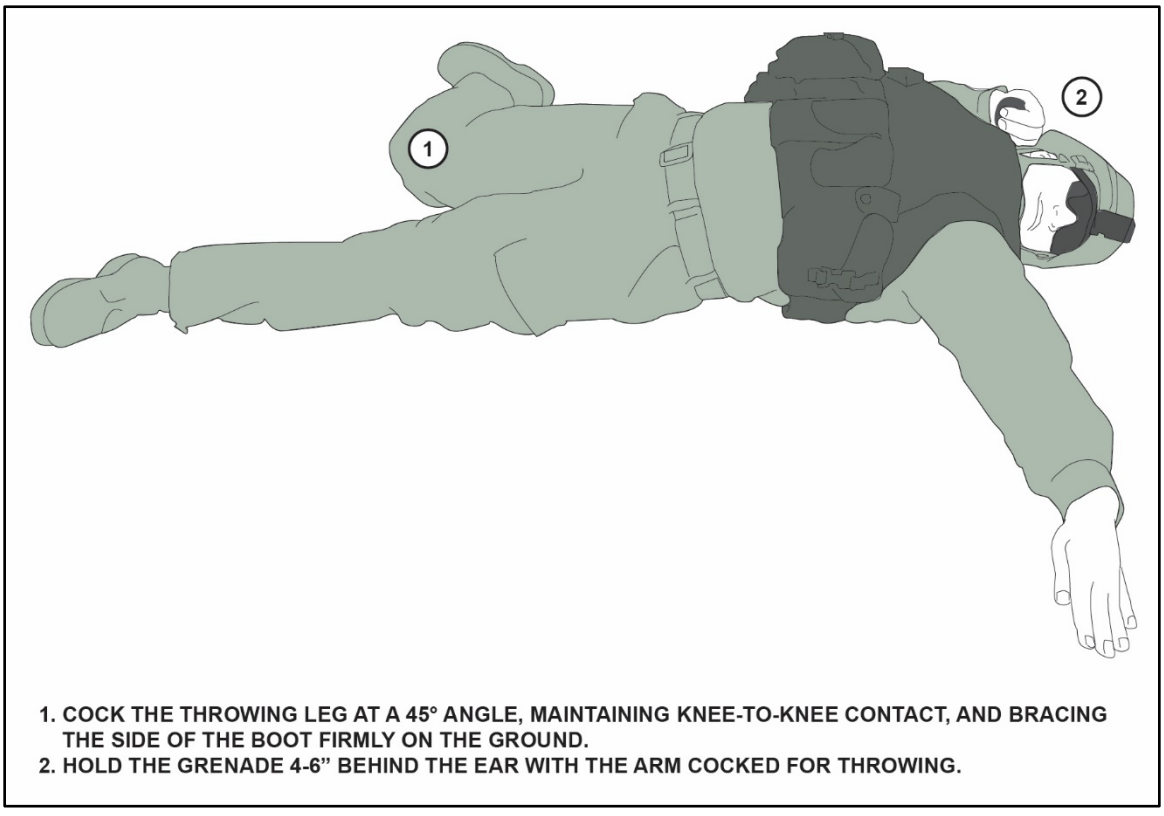

2
1
1. COCK THE THROWING LEG AT A 45° ANGLE, MAINTAINING KNEE-TO-KNEE CONTACT, AND BRACING THE SIDE OF THE BOOT FIRMLY ON THE GROUND.
2. HOLD THE GRENADE 4-6" BEHIND THE EAR WITH THE ARM COCKED FOR THROWING.

Figure 3-72. Alternate prone position (continued)

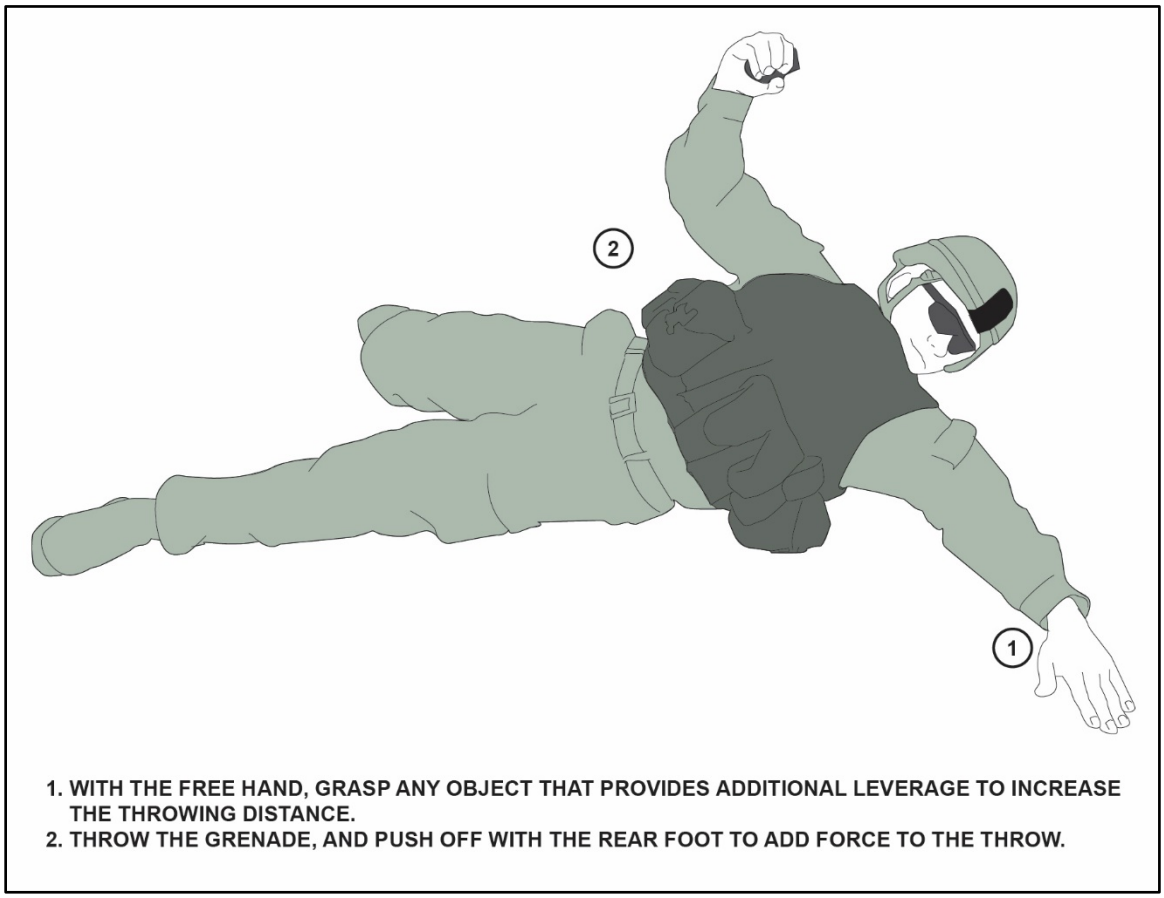

2
1
1. WITH THE FREE HAND, GRASP ANY OBJECT THAT PROVIDES ADDITIONAL LEVERAGE TO INCREASE THE THROWING DISTANCE.
2. THROW THE GRENADE, AND PUSH OFF WITH THE REAR FOOT TO ADD FORCE TO THE THROW.

Figure 3-73. Alternate prone position (continued)

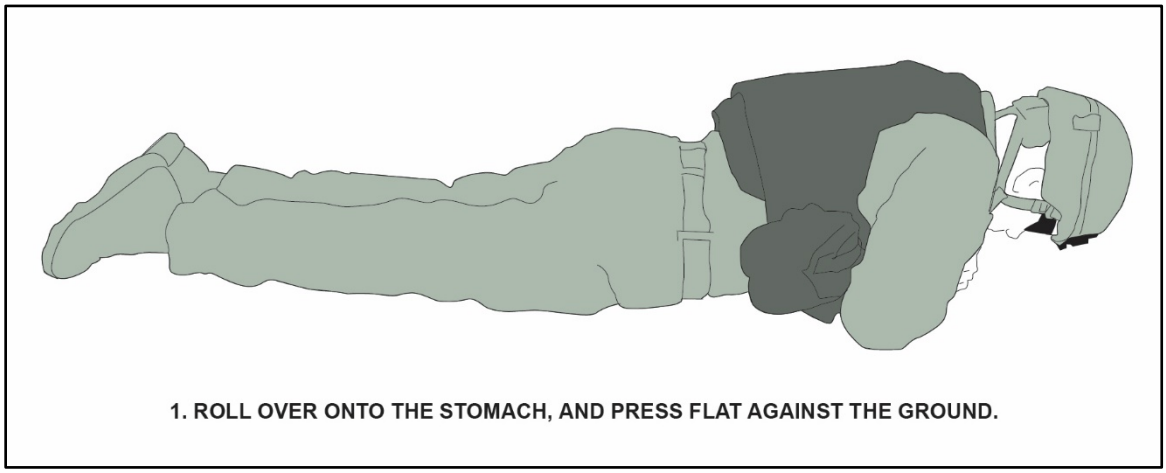


Figure 3-74. Alternate prone position (continued)

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Chapter 4

Pyrotechnic Signals and Simulators

Chapter 4 covers all military pyrotechnics, such as communication signals, surface trip flares, simulated signals, and illumination ground signal kits (see figure 4-1). Each section provides the general characteristics, description, major components, and principle of operations for each device.

Star Clusters			
Model	***Burning Time***	***Altitude***	***Candlepower***
M125A1 (Green)	6 to 10 seconds	76 to 91 meters	9,000
M158 (Red)	6 to 10 seconds	76 to 91 meters	30,000
M159 (White)	6 to 10 seconds	220 to 229 meters	30,000
Star Parachutes			
Model	***Burning Time***	***Altitude***	***Candlepower***
M126A1 (Red Star)	60 seconds	200 to 228 meters	10,000
M127A1 (White Star)	60 seconds	200 to 228 meters	125,000
M195 (Green Star)	50 seconds	200 to 228 meters	5,000

Surface Trip Flares				
Model	***Burning Time***	***Altitude***	***Candlepower***	***Activation***
M49A1	55 seconds	300 meters	35,000	Trip Wire

Early Warning Simulators				
Model	***Functioning Time***	***Effects***	***Activation***	***Type***
M117 (Flash)	Instantaneous	Flash Simulator	Trip Wire	Booby Trap
M118 (Illumination)	28 seconds	Illumination	Trip Wire	Booby Trap
M119 (Whistling)	2.5 to 5 seconds	Whistle	Trip Wire	Booby Trap

Hand-Held Simulators			
Model	***Functioning Time***	***Effects***	***Activation***
M115A2 (Ground-Burst)	2 to 4 seconds	Artillery simulator, Burst	Handheld, thrown
M116A1 (Hand Grenade)	5 to 10 seconds	Grenade simulator, Burst	Handheld, thrown

Figure 4-1. Pyrotechnic signals and simulators information list

PYROTECHNIC COMMUNICATION SIGNALS

4-1. The two classifications of pyrotechnic communication signals are handheld signals and ground smoke signals. Both types of signals come in varied color designs. Soldiers can use these varied color designs to coordinate troop movements and, in the case of an emergency, designate pick-up points, and for illumination.

Note. The signals are usually prescribed at command level and prearranged according to the signal operating instructions.

4-2. When choosing a pyrotechnic signal, Soldiers must consider the signal's intensity and color based on the current mission. For example, Soldiers normally use red to signal medical evacuation assets, while other communication signals with more intense candlepower may be necessary to signal further away. Soldiers should also avoid using red and green star clusters near aircraft at night as these may be mistaken for tracers.

4-3. In daylight, Soldiers should adhere to the following considerations:

- It can be difficult to differentiate between white and green depending on lighting conditions.
- Green is pale in daylight and is especially difficult to detect in fog, haze, or smoke-filled skies. In fact, white flares are easier to detect in daylight than green.
- White flares can be mistaken for illumination flares.
- Red may be difficult to detect when launched in a position that forces the observer to see it near a vivid sunrise or sunset.

EMPLOYING HANDHELD SIGNALS

4-4. The following is an example of how Soldiers will employ handheld pyrotechnic signals using the steps below:

- Observe the surrounding area to ensure you have overhead clearance.
- Grasp the signal firmly with your nonfiring hand, red-knurled band down, with the bottom of the hand above the red band.
- With your firing hand, remove the firing cap from the upper end of the signal.
- Point the ejection end of the signal up and away from your body.
- Push the firing cap onto the signal until the open end of the cap aligns with the red band.
- Strike the bottom of the cap using a sharp blow with the palm of your firing hand or strike it on a hard surface, keeping your nonfiring arm rigid. See figure 4-2 for more information on launching pyrotechnic signals.

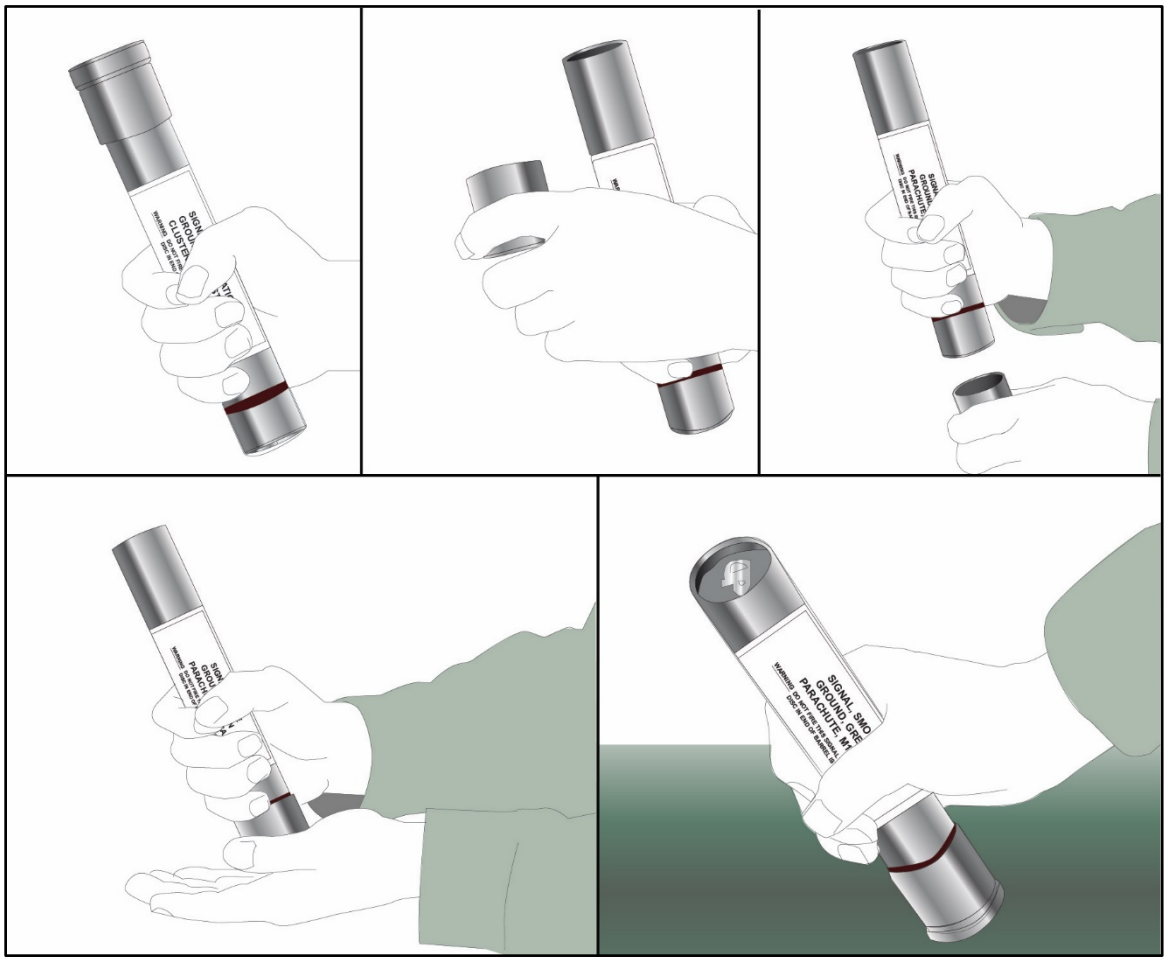


Figure 4-2. Launching pyrotechnic communication signals

DANGER

Do not fire a handheld signal in an area without overhead clearance. When fired in an area without overhead clearance, the signal can cause fire, injury, or death.

WARNING

Turn your head away from the signal to avoid injury to your face and eyes from particles ejected by the small rockets.

CAUTION

When firing handheld signals by hand, avoid contact with the bones of the hand. This can result in injury to the hand. Instead, use the meaty portion of the hand.

4-5. In the event of a misfire—

- While keeping the signal aimed at 90 degrees, pull the cap back to the red-knurled band.
- Make two more attempts to fire.
- If it still does not fire, wait 30 seconds, keeping the arm rigid and the signal aimed overhead.
- Return the cap to the ejection end of the signal and dispose of it according to the unit SOP.

TYPES OF HANDHELD SIGNALS

4-6. Handheld signals include the following:

- Star clusters.
- Star parachutes.

4-7. Star clusters and star parachutes come issued in an expendable launcher that consists of a launching tube and firing cap.

Notes. The launcher tubes are not reusable, but in most peacetime situations, they need to be kept for accountability purposes.

Soldiers should also avoid using red and green star clusters near aircraft at night as these may be mistaken for tracers.

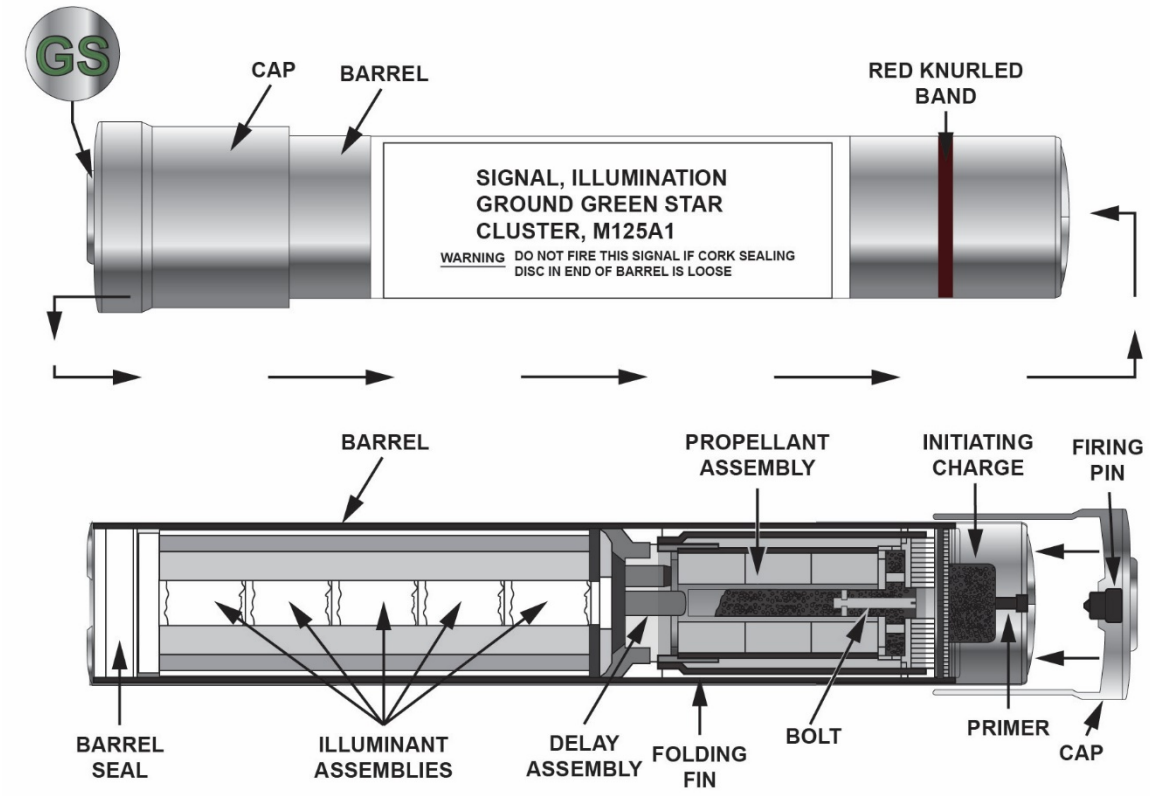
Star Clusters

4-8. Star cluster signals consist of five-star illuminant assemblies and a rocket motor propulsion assembly contained in a handheld aluminum launching tube. The base of the launching tube contains a primer and an initiating charge. As shipped, the firing pin cap is assembled to the forward end and must be reversed for firing. Stabilizing fins on the tail assembly of the rocket fold parallel to the axis of the signal. A bolt, which also transfers the initiating charge flash to the propellant, extends into the center of the solid propellant, which fills the propulsion assembly. The illuminant assembly is mounted on top of the propulsion assembly with a delay assembly and an expelling charge between them. A label specifying firing procedures is secured to the body of the signal. For more information on star clusters, see figures 4-3 through 4-5 on pages 4-5 through 4-7.

4-9. Star cluster types include—

- M125A1 (green star cluster).
- M158 (red star cluster).
- M159 (white star cluster).

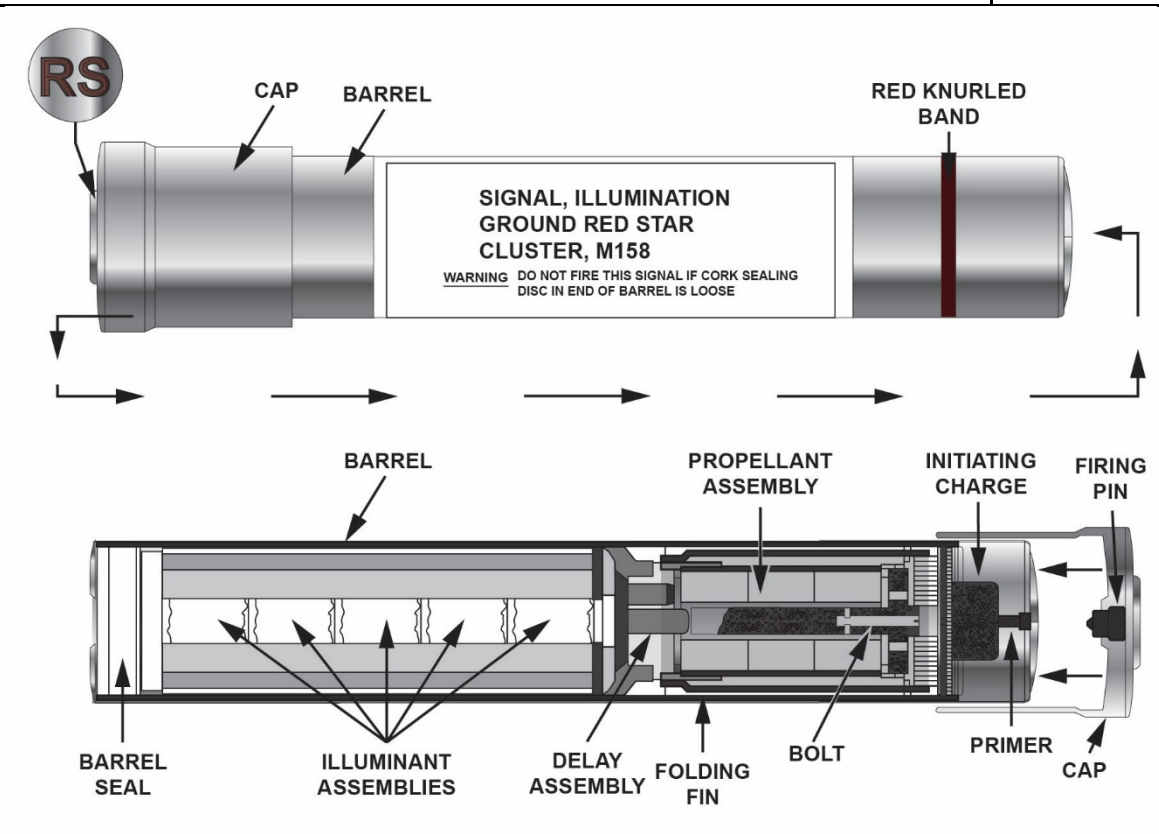
DODIC L314	*M125A1 Green Star Cluster*
Use star clusters primarily for signaling during periods of limited visibility or daytime operations. Secondary uses can be for illuminating purposes. These signals produce a cluster of five free-falling pyrotechnic stars. The label and muzzle cap of a handheld signal identifies its color and type. The star clusters also have two raised letters (GS) on the muzzle cap.	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Cluster, Green Star M125A1
NSN	1370-00-629-2335
Body/Colors and Markings	Aluminum cylinder / white label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (green)
Total Weight	20.8 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	6 to 10 seconds
Height	76 to 91 meters
Candlepower	9,000
Legend: DODIC – Department of Defense identification code, GS – green star, NSN – national stock number	

Figure 4-3. M125A1 green star cluster

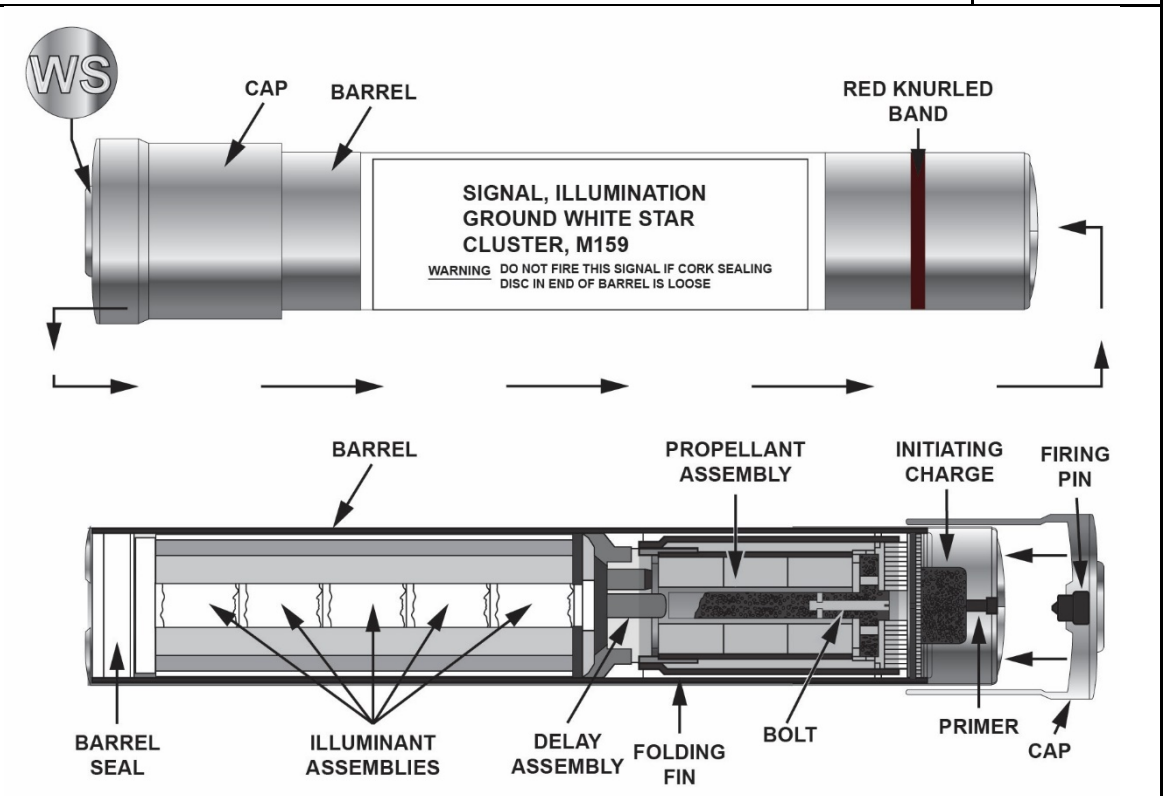
DODIC L306	*M158 Red Star Cluster*
Use star clusters primarily for signaling during periods of limited visibility or daytime operations. Secondary uses can be for illuminating. These signals produce a cluster of five free-falling pyrotechnic stars. The label and muzzle cap of a handheld signal identifies its color and type. The star clusters also have two raised letters (RS) on the muzzle cap.	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Cluster, Red Star M158
NSN	1370-00-756-2591
Body/Colors and Markings	Aluminum cylinder / white label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (red)
Total Weight	20.8 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	6 to 10 seconds
Height	76 to 91 meters above ground
Candlepower	30,000
Legend: DODIC – Department of Defense identification code, NSN – national stock number, RS – red star	

Figure 4-4. M158 red star cluster

DODIC L307	*M159 White Star Cluster*
Use star clusters primarily for signaling during periods of limited visibility or daytime operations. Secondary uses can be for illuminating. These signals produce a cluster of five free-falling pyrotechnic stars. The label and muzzle cap of a handheld signal identifies its color and type. The star clusters also have two raised letters (WS) on the muzzle cap.	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Cluster, White Star M159
NSN	1370-00-756-2588
Body/Colors and Markings	Aluminum cylinder / white label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (white)
Total Weight	20.8 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	6 to 10 seconds
Average Altitude	220 to 229 meters above ground
Candlepower	30,000
Legend: DODIC – Department of Defense identification code, NSN – national stock number, WS – white star	

Figure 4-5. M159 white star cluster

Star Parachutes

4-10. These signals consist of a parachute-suspended illuminant assembly and a rocket motor propulsion assembly contained in a handheld aluminum launching tube. The base of the launching tube contains a primer and initiating charge. As shipped, the firing pin cap is assembled to the forward end and must be reversed for firing. Stabilizing fins on the rocket are folded parallel to the axis of the signal. A bolt, which transfers the initiating charge flash to the propellant, extends into the center of the solid propellant, filling the propulsion assembly. The parachute illuminant assembly is mounted on top of the propulsion assembly with a delay assembly and an expelling charge between them. The parachute with suspension cords is packed on top of the illuminant, and the tube end is sealed with a cork disk (rocket barrel seal). A label specifying the firing procedure is secured to the body of the signal.

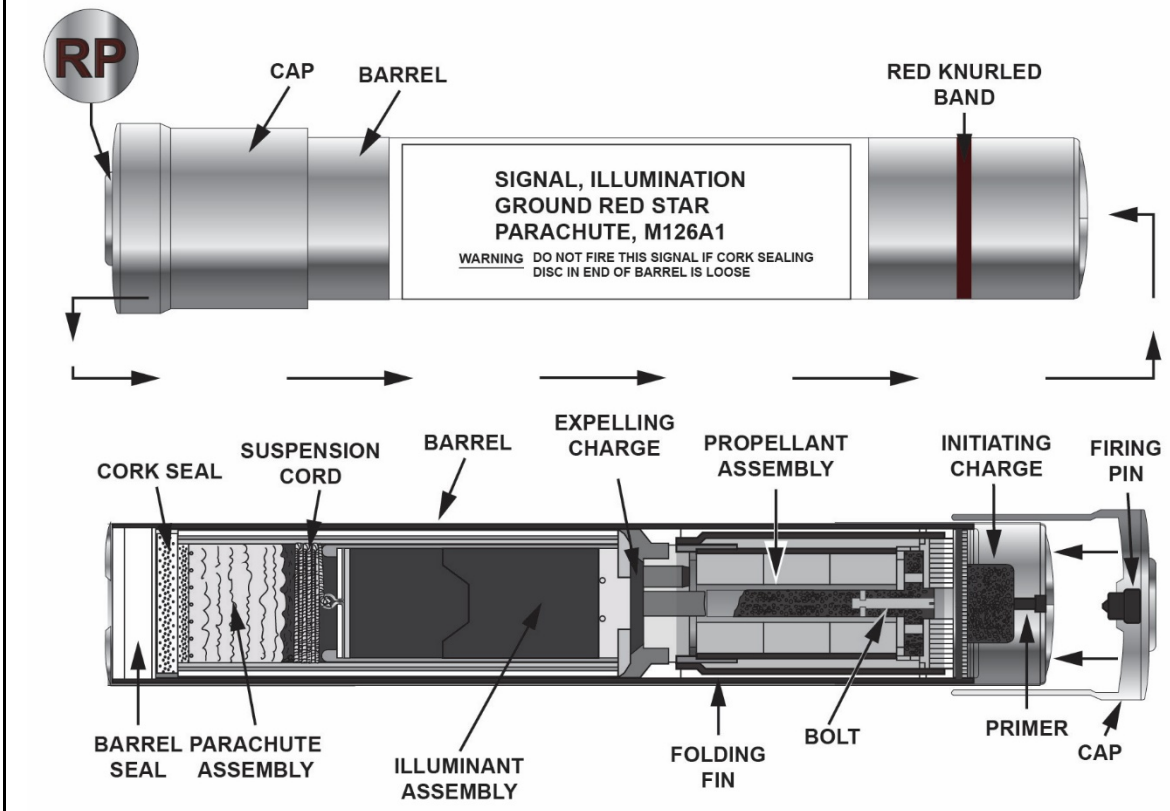
Note. Fire these signals in the same manner as the star clusters.

4-11. Star parachutes types include—

- M126A1 (red star).
- M127A1 (white star).
- M195 (green star).

4-12. The M126, M127, and the M195 star parachutes rise from 200 to 228 meters above ground. The M126 and M127 star cluster burns for approximately 60 seconds, and the M195 star cluster burns for approximately 50 seconds. The average rate of descent for these signals are 2.1 meters per second. The signals are visible from 50 to 58 kilometers at night. (See figures 4-6 through 4-8 on pages 4-9 through 4-11.)

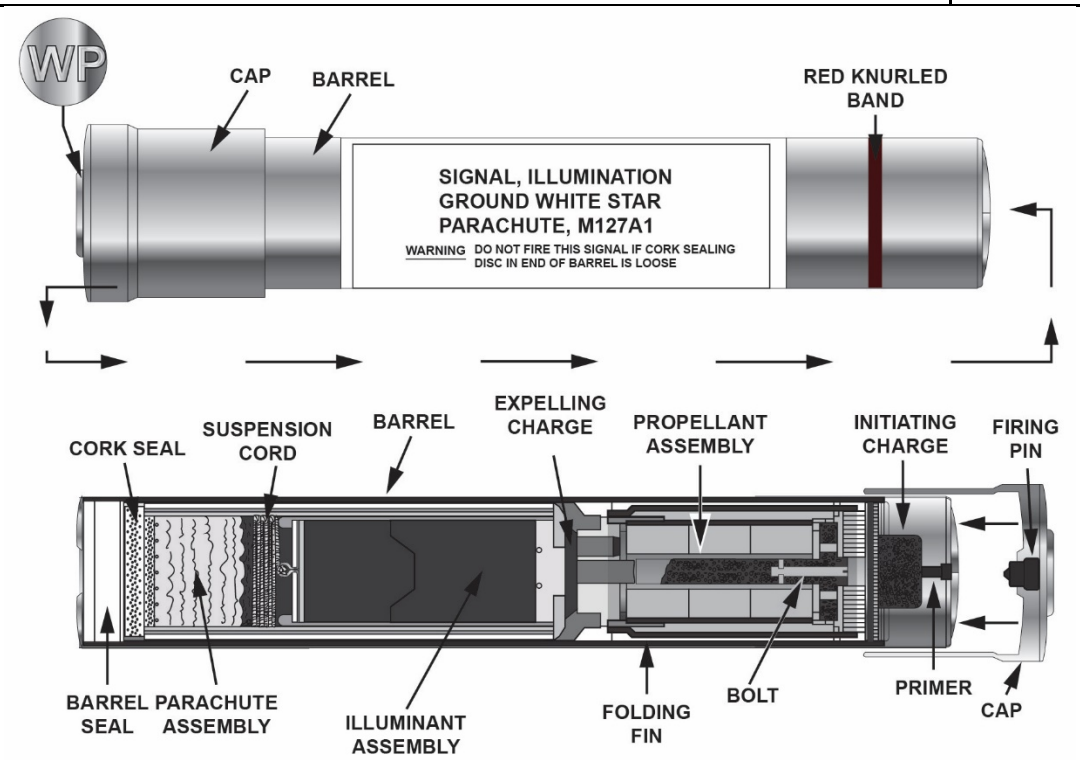
DODIC L311	*M126A1 Red Star Parachute*
Use star parachutes primarily for signaling during periods of limited visibility and daytime operations. These signals produce a single illuminant star suspended from a parachute. The label and muzzle cap of a handheld signal identifies its color and type. The star parachute also has two raised letters (RP) on the muzzle cap.	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Parachute, red star, M126A1
NSN	1370-00-629-2336
Body/Colors and Markings	Aluminum cylinder / white label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (red)
Total Weight	19.2 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	60-second minimum
Average Altitude	200 to 228 meters
Candlepower	10,000
Legend: DODIC – Department of Defense identification code, NSN – national stock number, RP – red star parachute	

Figure 4-6. M126A1 red star parachute

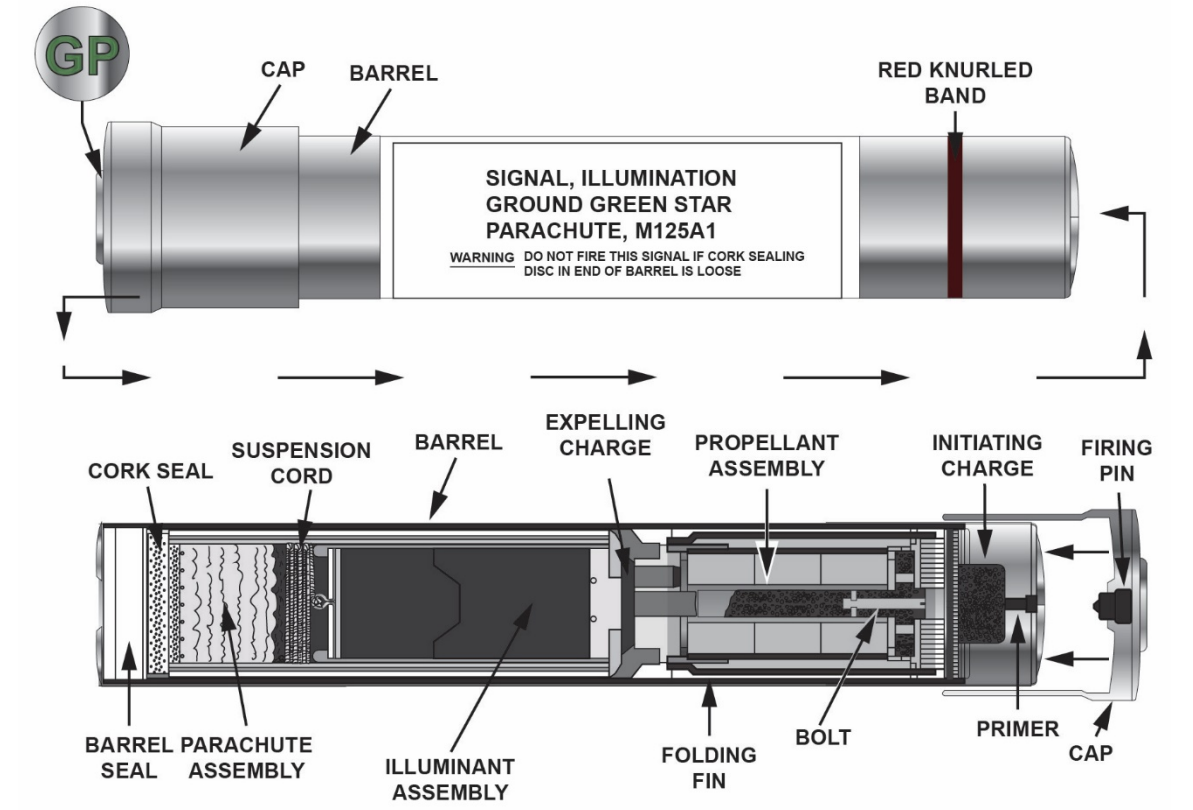
DODIC L312	*M127A1 White Star Parachute*
Use star parachutes primarily for signaling during periods of limited visibility and daytime operations. These signals produce a single illuminant star suspended from a parachute. The label and muzzle cap of a handheld signal identifies its color and type. The star parachute also has two raised letters on the muzzle cap. (WP) The M127A1 is primarily used for illumination during periods of limited visibility	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Parachute, White Star, M127A1
NSN	1370-00-753-1859
Body/Colors and Markings	Aluminum cylinder / White label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (white)
Total Weight	19.2 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	60-second minimum
Average Altitude	200 to 228 meters
Candlepower	125,000
Legend: DODIC – Department of Defense identification code, NSN – national stock number, WP – white star parachute	

Figure 4-7. M127A1 white star parachute

DODIC L305	*M195A1 Green Star Parachute*
Use star parachutes primarily for signaling during periods of limited visibility and daytime operations. These signals produce a single illuminant star suspended from a parachute. The label and muzzle cap of a handheld signal identifies its color and type. The star parachute also has two raised letters (GP) on the muzzle cap.	



Components and Characteristics	*Details*
Nomenclature	Signals, Illumination, Ground: Parachute, Green Star, M125A1
NSN	1370-00-182-3408
Body/Colors and Markings	Aluminum cylinder / white label with black markings, cork seal with the color of the signal and raised letters on the muzzle cap (green)
Total Weight	20.8 ounces
Pyrotechnic Charge	Illuminant composition / black powder
Burning Time	50-second minimum
Average Altitude	200 to 228 meters
Candlepower	5,000
Legend: DODIC – Department of Defense identification code, GP – green star parachute, NSN – national stock number	

Figure 4-8. M195 green star parachute

SURFACE TRIP FLARES

4-13. The trip flare consists of an illuminant assembly, cover-loading assembly, and mounting-bracket assembly. The illuminant assembly is an aluminum case containing an ignition increment and three illuminant increments. The waterproof cover-loading assembly contains a percussion primer, intermediate charge, and a spring-loaded striker. The mounting bracket holds the illuminant assembly in the position desired. Two carriage bolts with wing nuts tighten the sleeve, and a flange with two nail holes is included for vertical mounting. The base of the bracket is pointed for in-ground installation (see figure 4-9).

4-14. Surface trip flares include safety features, such as triggers and/or trip wires. The trigger attaches to the exterior of the mounting bracket. The lever hinges to the cover and, when unarmed, the safety clip holds it in position. Attaching a trip wire to the trigger or pull pin arms the flare. A pull on the trip wire causes the trigger tongue or pull pin to release the lever, which, in turn, permits the firing pin to strike the primer. The primer sets off the intermediate charge, and the intermediate charge ignites the first-fire composition on the ignition increment of the flare.

WARNINGS

Surface trip flares can cause fires when thrown on dry tinder.

The minimum safe distance from an ignited surface trip flare is 2 meters because of sparks and the popping of burning magnesium.

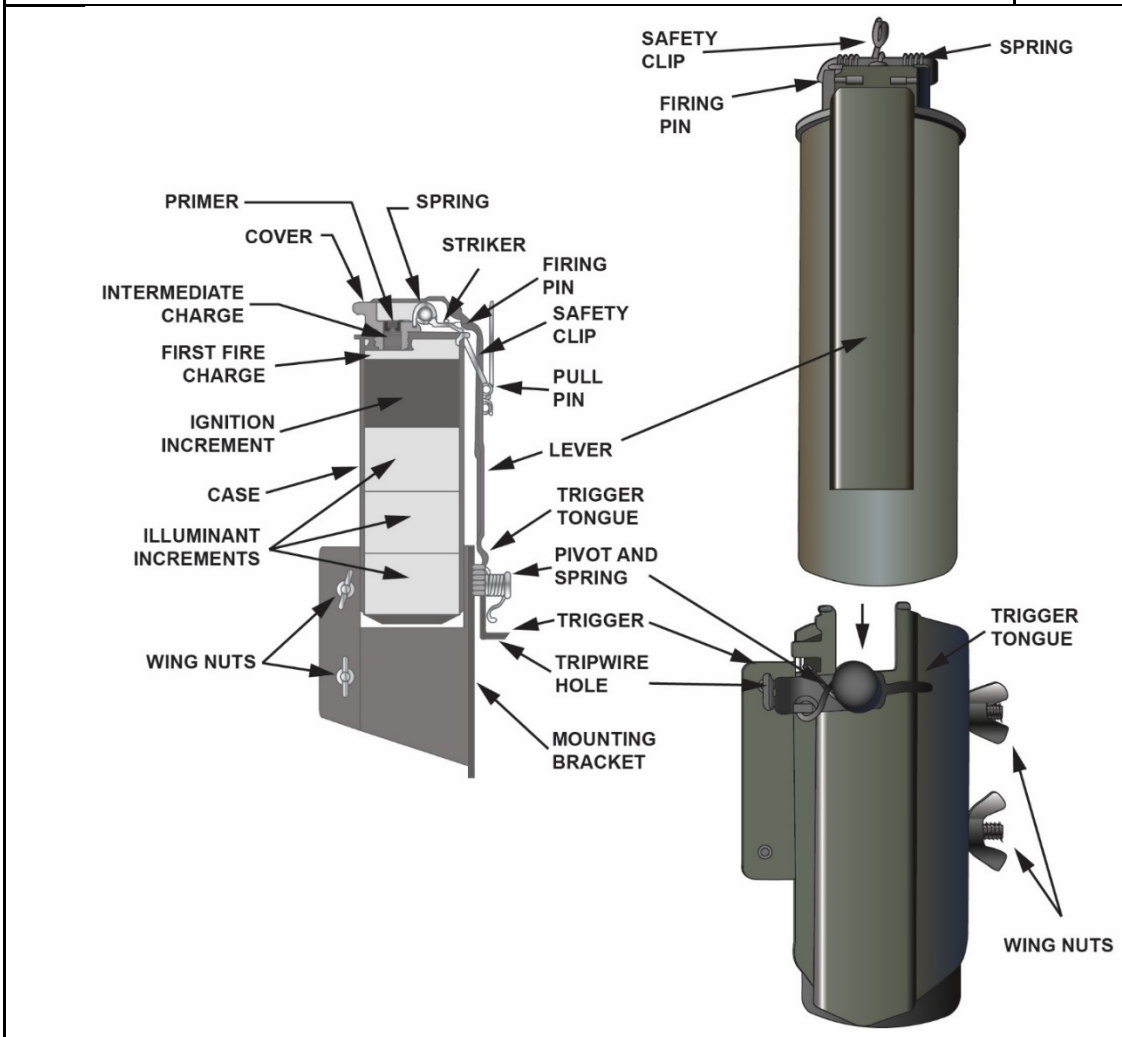
Never look directly at a burning surface trip flare. The intense flame can injure your eyes. At close ranges, surface trip flares may damage night vision goggles (NVG) and sights.

DO NOT attempt to “cook off" a trip flare. The fuze has a 0-second time delay.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a trip flare. DO NOT tape any portion of the trip flare during storage.

DODIC L495	*M49A1 Surface Trip Flare*
The M49A1 surface trip flare resembles a hand grenade in size and shape, except that it comes with a bracket provided for attachment to a tree or post and a trigger mechanism for firing. The primary purpose is to provide early warning of infiltrating enemy troops by illuminating the area of the advancing enemy. It can also ignite fires or force an enemy to react or withdraw from the immediate area.	



Components and Characteristics	*Details*
Nomenclature	Flare, Surface, Trip, M49A1
NSN	1370-00-752-8060
Body/Colors and Markings	Aluminum / olive drab body with black markings
Total Weight	12.0 ounces
Filler	Illuminant composition
Effects	The trip flare produces 35,000 candlepower illumination for 55 seconds (minimum). The area of illumination is an approximately 300-meter radius.
Method of Activation	Trip wire (50 feet)
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-9. M49A1 surface trip flare

SURFACE TRIP FLARES INSTALLATION

4-15. Soldiers should mount the trip flare using the following procedures (see figure 4-10):

- Choose a location.

Note. The location chosen for the flare should be to the right (looking toward the enemy) of the field to be illuminated, so the trip wire, when attached, runs to the right of the flare (when facing the trigger). A graphic training aid (GTA) is included in the trip flare's shipping box that gives detailed instructions for installing the flare.

- Using two of the nails supplied, nail the mounting bracket (with ends of the two tabs upward) to a stake, post, or suitable support at the height desired for the trip wire (usually 15 to 18 inches above the ground).

WARNING

Never mount a surface trip flare above knee level.

- Mount the flare by sliding the two square holes of the anchor clip over the matching tabs on the holder and press the flare down until it locks in position.

Note. If desired, you may drive a third nail through the hole in the lower end of the anchor clip.

- Fasten one end of the trip wire to the post, stake, or other rigid object at the desired distance from the flare (usually about 40 feet) and at the right of the flare (when facing the flare trigger).
- Press the fuze safety lever down with one hand and rotate the trigger one-quarter turn counterclockwise against the spring pressure with the other hand to the vertical position, so the lower end of the safety lever is behind the upper end of the trigger.
- Pull the loose end of the trip wire taut and fasten it to the tripwire hole in the lower end of the trigger.
- Check to see that the trip wire is taut and fastened at both ends and the trigger tongue is vertical with the fuze safety lever (ensure the bottom portion of the lever is behind the upper end of the trigger tongue) so when the safety clip and pull pin are withdrawn, the trigger tongue holds the safety lever.

DANGER

Ensure that the trigger tongue is vertical with the fuze safety lever (lever is behind the upper end of the trigger tongue) so when the safety clip and pull pin are withdrawn, the safety lever is still held by the trigger tongue. Failure to do so can result in accidental ignition of the trip flare.

- Hold the lever with one hand, while carefully withdrawing the pull ring and safety pin from the flare.
- Carefully release the hold on the safety lever, while making sure the upper end of the trigger tongue holds the lever in place.
- Move to a safe location.

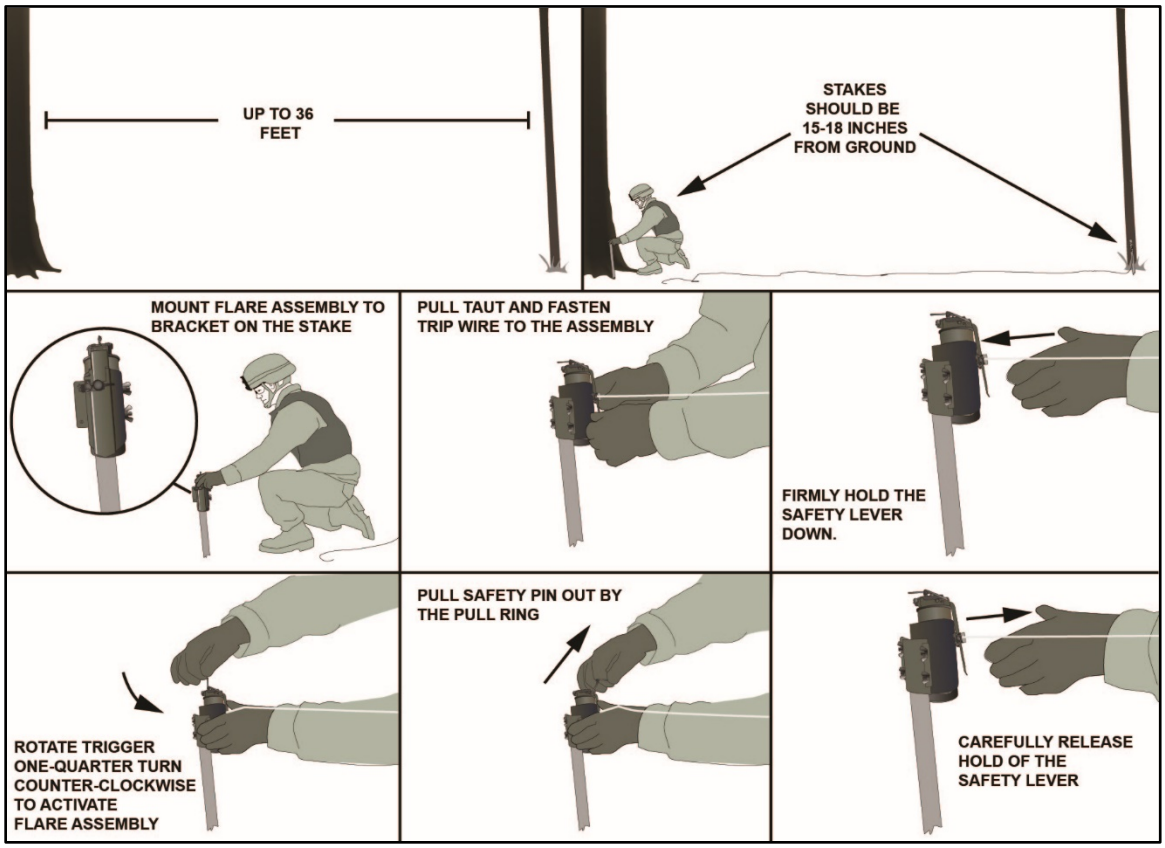

UP TO 36 FEET
STAKES SHOULD BE 15-18 INCHES FROM GROUND
MOUNT FLARE ASSEMBLY TO BRACKET ON THE STAKE
PULL TAUT AND FASTEN TRIP WIRE TO THE ASSEMBLY
FIRMLY HOLD THE SAFETY LEVER DOWN.
ROTATE TRIGGER ONE-QUARTER TURN COUNTER-CLOCKWISE TO ACTIVATE FLARE ASSEMBLY
PULL SAFETY PIN OUT BY THE PULL RING
CAREFULLY RELEASE HOLD OF THE SAFETY LEVER

Figure 4-10. Trip flare installation

WARNINGS

Never conduct preventive maintenance checks and services while the trip flare is mounted for operation. Render the trip flare safe before cleaning by following the removal steps in paragraph 4-16.

SURFACE TRIP FLARES REMOVAL

4-16. To remove a trip flare—

- Carefully depress the safety lever to align the holes in the lever and the fuze.
- Insert and return the safety clip and pull pin to their original configuration.
- Detach the trip wire from the trigger, while holding the safety lever against the flare.
- Rotate the trigger to its original position.
- Remove the nails from the mounting bracket and the anchor clip.
- Return the flare to its original configuration in the mounting bracket and tighten the wing nuts snug.
- Return the flare to its original packaging if available.

SIMULATED SIGNALS

4-17. Some pyrotechnic simulators can provide early warning signals and illuminate an immediate area; however, the primary purpose and design is to imitate the sounds and effects of combat detonations during field training exercises.

EARLY WARNING SIMULATORS

4-18. Early warning simulators generate different effects upon initiation but are used the same way. They activate by triggering trip wires attached to the igniter cords. There are three types of booby trap simulators, each generating a different effect upon initiation. For more information on early warning simulators, see figures 4-11 through 4-13 on pages 4-17 through 4-19.

4-19. Early warning simulators include the following:

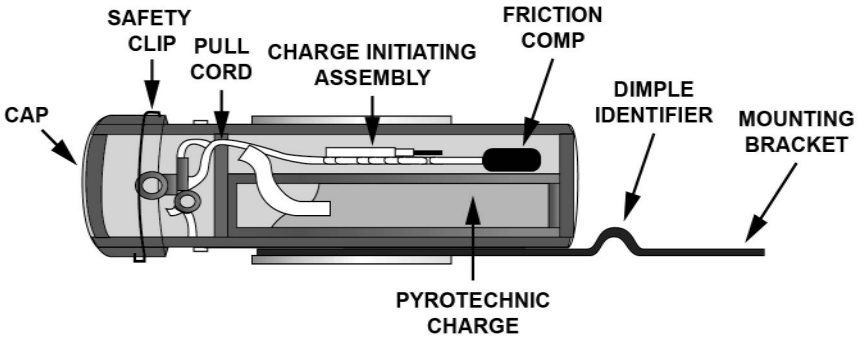
- M117 flash explosive booby trap simulator.
- M118 illuminating explosive booby trap simulator.
- M119 whistling explosive booby trap simulator.

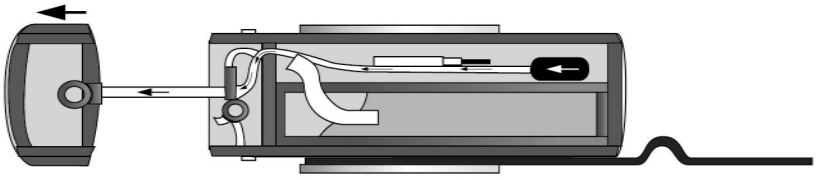
WARNING

Simulators are potentially dangerous if activated close to personnel or if improperly handled.

DO NOT pull the igniter cord on booby trap simulators by hand, as it immediately activates. Booby trap simulators may cause ear damage or burns if activated within 2 meters of personnel. Never open a simulator; the photoflash powder is extremely susceptible to flash ignition by even a slight amount of friction.

DODIC L598	*M117 Flash Explosive Booby Trap Simulator*
The M117 flash booby trap simulator produces an explosion, flash, and sound. The booby trap simulator is a pyrotechnic device used to teach the installation, detection, and use of booby-traps and to instill caution in troops exposed to traps set by an enemy. The M117 is explodes instantaneously as soon as the pull cord is initiated.	

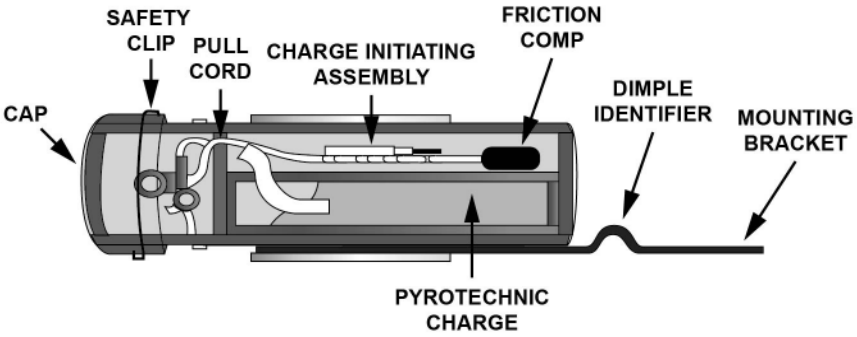




Components and Characteristics	*Details*
Nomenclature	Simulator, Explosive Booby-trap: Flash M117
NSN	1370-00-028-5256
	With safety clip 1370-01-536-8398
Body/Colors and Markings	Kraft paper / white label with black markings
Total Weight	2.24 ounces
Pyrotechnic Charge	0.09-ounce flash composition (loose)
Functioning Time	Instantaneous explosion
Effect	Explosion, flash, and sound time
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-11. M117 flash explosive booby trap simulator

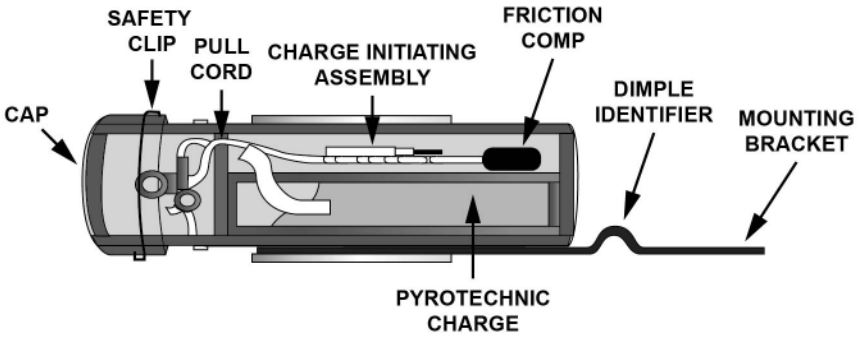
DODIC L599	*M118 Illuminating Explosive Booby Trap Simulator*
The M118 illuminating booby trap simulator produces illumination. The booby trap simulator is a pyrotechnic device used to teach the installation, detection, and use of booby-traps and to instill caution in troops exposed to traps set by an enemy. The M118 explodes instantaneously as soon as the pull cord is initiated.	



Components and Characteristics	*Details*
Nomenclature	Simulator, Explosive Booby-trap: Illuminating, M118
NSN	1370-00-028-5257
	With safety clip 1370-01-536-8398
Body/Colors and Markings	Kraft paper / white label with black markings
Total Weight	2.24 ounces
Pyrotechnic Charge	0.18-ounce Illumination composition (consolidated)
Functioning Time	28 seconds with flame
Effect	Illumination
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-12. M118 illuminating explosive booby trap simulator

DODIC L600	*M119 Whistling Explosive Booby Trap Simulator*
The M119 whistling booby trap simulator produces a whistling sound. The booby trap simulator is a pyrotechnic device used to teach the installation, detection, and use of booby traps and to instill caution in troops exposed to traps set by an enemy. The M119 explodes instantaneously as soon as the pull cord is initiated.	



Components and Characteristics	*Details*
Nomenclature	Simulator, Explosive Booby-trap: Whistling, M119
NSN	1370-00-028-5255
	With safety clip 1370-01-536-8400
Body/Colors and Markings	Kraft paper / white label with black markings
Total Weight	2.24 ounces
Pyrotechnic Charge	0.12-ounce whistle composition (consolidated)
Functioning Time	2.5- to 5-second whistle
Effect	Whistle sound
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-13. M119 whistling explosive booby trap simulator

4-20. The instructions included with the early warning simulator show how to install the simulator on a tree. This is just one technique of installing the device.

> ***Note.*** A GTA is included in the early warning simulator's cardboard shipping box that gives detailed instructions for installing the simulator. TM 9-1370-207-10 provides the same illustrative instructions.

4-21. To install an early warning simulator (see figure 4-14, page 4-20)—

- Select two objects, such as trees or stakes, no more than 20 feet apart.
- About 6 inches above the ground, drive a large nail (nail 1) into one object.
- Drive a staple (staple 1) about 2 inches above and to the right of nail 1.
- Drive a second staple (staple 2) into the object about 20 inches above staple 1.

- Drive a large nail (nail 2) 1 inch below staple 2.
- Attach one end of the spring to staple 1.
- Extend the other end of the spring and attach to nail 2.
- Make a 6-inch loop in one end of the tripwire and tie it with a double-knot.
- Thread the loop down through staple 2 and attach the loop to the end of the spring held in place by nail 2.
- Maintain tension on the tripwire, run the spooled wire down the object, under nail 1, and extend it toward the second object.
- Drive staple 3 into the second object at the lowest point that allows free travel of the tripwire.
- Maintain tension on the tripwire, and tie the wire to nail 3, just below its head. Wedge nail 3 between staple 3 and the object to ensure a taut and secure tripwire.
- Return to the first object and carefully unhook the extended spring from nail 2. The spring should keep the wire taut.
- While wearing gloves and eye and hearing protections, remove the tape securing the simulator cap. Remove the cap, allowing the pull cord to hang freely.
- Nail the simulator about 4 inches above the top of the spring.
- Leave 1 or 2 inches of slack in dangling cord and tie the cord to the end of the spring that is fastened to the tripwire.

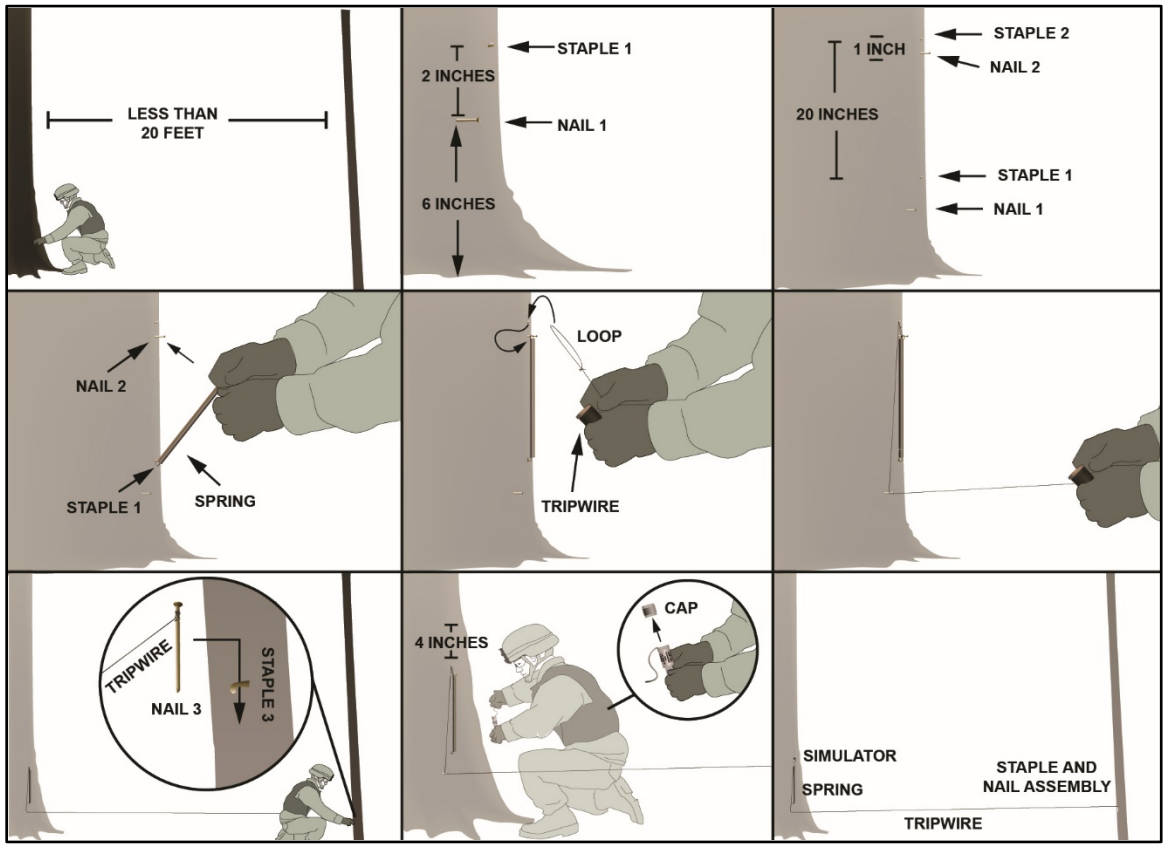


Figure 4-14. Early warning simulators installation

DANGER

Early warning simulators must be mounted; do not manually activate them by hand. Early warning simulators activate immediately.

Early warning simulators can seriously injure personnel within 2 meters.

Never open a simulator; the photoflash powder is extremely susceptible to flash ignition by even a slight amount of friction.

WARNINGS

DO NOT activate early warning simulators in loose gravel, sticks, or other materials that could become projectiles, or throw them into dry leaves, grass, or other flammable materials. Dry grass or leaves within 3 feet may ignite.

DO NOT tape or wire early warning simulators to any surface. Use nails.

DO NOT remove the simulator cap before use.

GROUND-BURST SIMULATOR

4-22. The body of this simulator consists of a cylindrical paper tube containing a photoflash charge and a whistle assembly. The whistle assembly is a paper tube containing a slow-burning whistle composition. It extends from one end of the photoflash charge and joins a fuze lighter by a length of safety fuze. The fuze lighter is the friction-type M3A1 and is taped to the outside of the simulator. A safety clip through the cap of the fuze lighter prevents accidental detonation. A label lighter prevents accidental detonation. A label giving firing instructions is attached to the outside of each simulator. For more information on the M115A2 ground-burst simulator, see figure 4-15.

Note. Instructions for the ground-burst simulator are printed directly on the simulators.

WARNING

The surface danger zone for the M115A2 ground burst simulator is 30 meters.

DO NOT use the M115A2 projectile ground-burst simulator near personnel due to potential hazard from fragmentation. Ensure the simulator is not thrown to any point within 35 meters of unprotected personnel. When using the M115A2 ground-burst simulator, the thrower should turn away from the simulator after throwing and assume a protective stance.

WARNING

For protection, personnel throwing the M115A2 simulator must wear the following items: ear protection, safety eyewear, and a protective helmet and vest. The user must wear a standard-issue leather glove when employing this simulator.

WARNING

DO NOT activate the M115A2 in loose gravel, sticks, or other materials that could become projectiles. DO NOT throw into dry leaves, grass, or other flammable materials.

DODIC L594	*M115A2 Ground Burst Simulator*
The M115A2 projectile ground-burst simulator replicates the detonation of artillery and mortar projectiles or artillery-type rockets. Activate by pulling its M3A1 friction delay igniter cord and immediately throw into a cleared area. After a 6- to 10-second delay, it produces a high-pitched whistle that lasts 2 to 4 seconds and then detonates with a loud report and brilliant flash.	

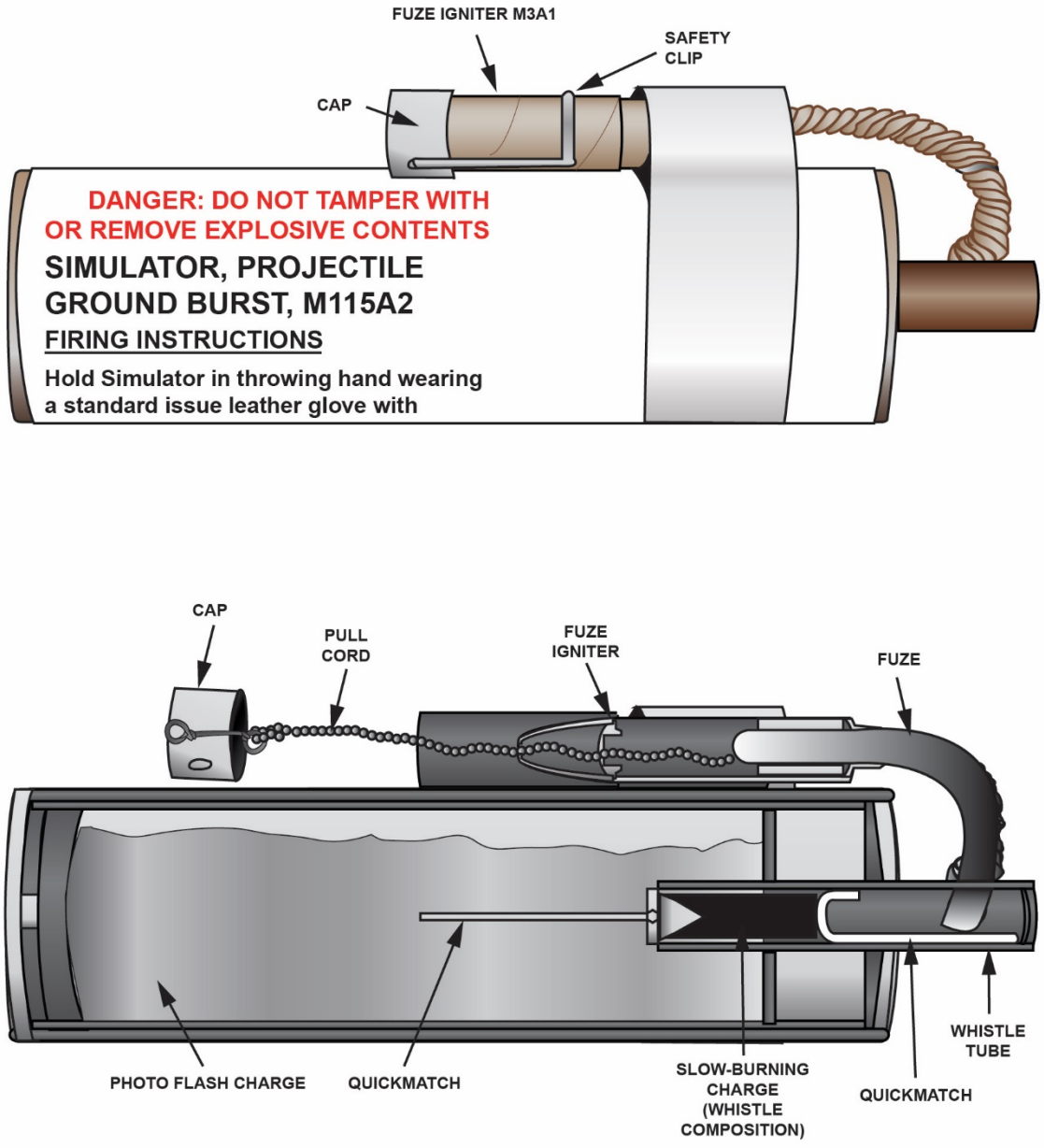


Figure 4-15. M115A2 ground burst simulator

DODIC L594	*M115A2 Ground Burst Simulator*
Components and Characteristics	***Details***
Nomenclature	Simulator, Projectile, Ground Burst, M115A2
NSN	1370-00-752-8126
Body/Colors and Markings	Kraft paper / white overall with label and black markings
Total Weight	4.8 ounces
Pyrotechnic Charge	Photoflash powder
Functioning Time	Whistle for 2 to 4 seconds
Effect	Burst 8–14 seconds after ignition
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-15. M115A2 ground burst simulator (continued)

4-23. To prepare and throw a ground-burst simulator by hand—

- Remove safety clip from fuze lighter.
- Grasp simulator in throwing hand. Carefully remove cap until free end of igniter and cord are partially extended.
- Assume throwing position (standing or kneeling). Jerk the pull cord once in a downward motion and throw immediately. (See figures 3-52 and 3-74, pages 3-66 through 3-81, for throwing positions.)

HAND GRENADE SIMULATOR

4-24. The body of this simulator consists of a cylindrical paper tube containing a sealed charge of photoflash powder. A fuze igniter, type M3A1, is taped to the outside of the tube and is joined to the photoflash charge by a safety fuze. A safety clip through the cap of the fuze igniter prevents accidental detonation. A label giving firing instructions is attached to the outside of each simulator (see figure 4-16).

WARNINGS

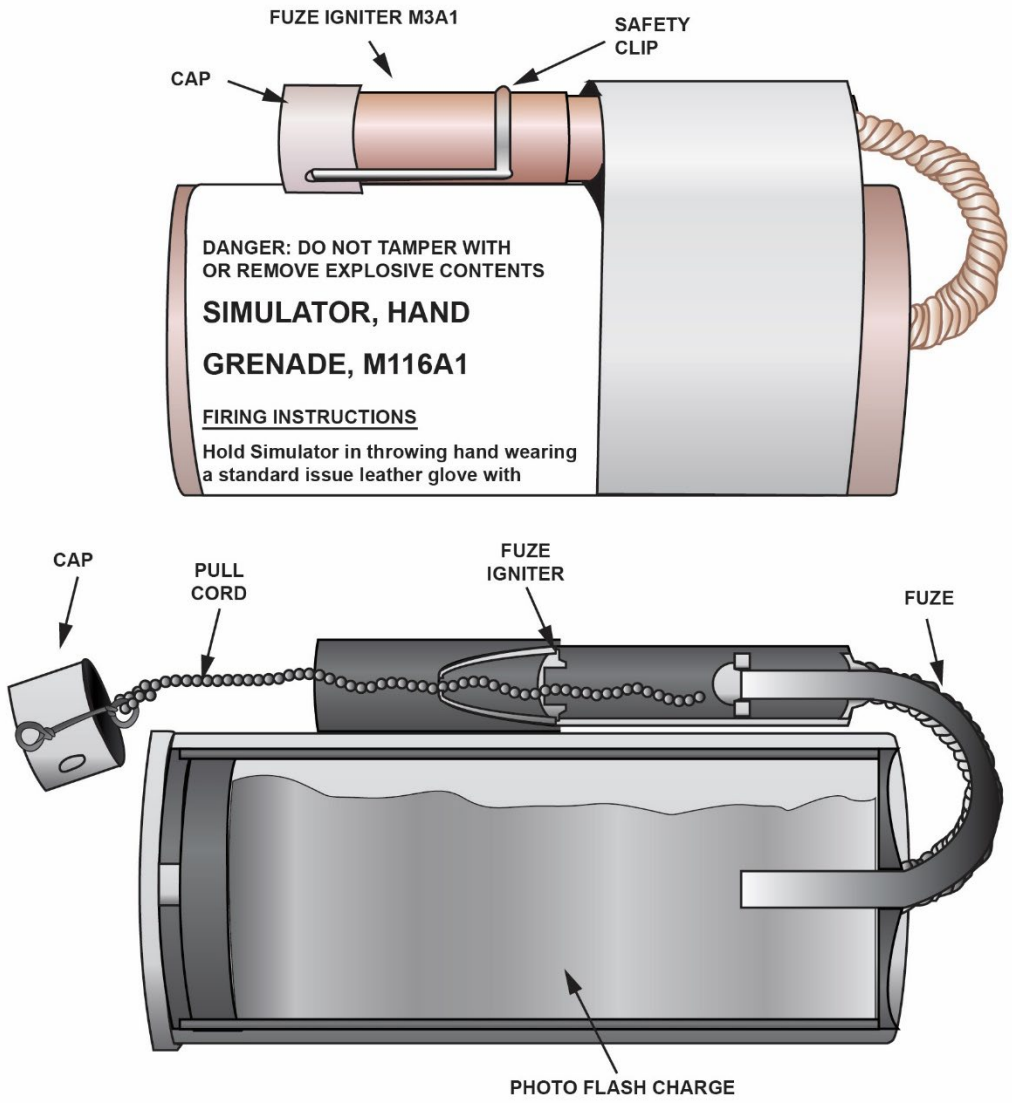
The M116A1 simulator manufactured before 2013 are white in color and have a 30-meters surface danger zone due to end cap displacement, and simulators manufactured after 2013 are yellow in color with a surface danger zone of 15 meters. The M116A1 hand grenade simulator DOES NOT whistle; it explodes 5 to 10 seconds after pulling the cord. Employ immediately after pulling the pull cord and seek cover until detonation. Observe and adhere to this distance; otherwise, hearing damage and possible fragmentation injury could result.

DO NOT activate the M116A1 in loose gravel, sticks, or other materials that could become projectiles. DO NOT throw into dry leaves, grass, or other flammable materials.

For protection, personnel throwing the M116A1 simulator must wear the following items: ear protection, safety eyewear, and a protective helmet and vest. The user must wear a standard-issue leather gloves when employing this simulator.

Note. Instructions for the hand grenade simulator are printed directly on the simulators.

DODIC L601	*M116A1 Hand Grenade Simulator*
Use the M116A1 hand grenade simulator to create battle noises and flashes during training. It differs from the ground-burst simulator in that it is shorter and does not emit a high-pitched whistle before detonation. Throw the hand grenade simulator in the same manner as a live grenade. It creates a flash and loud report 5 to 10 seconds after ignition.	



Components and Characteristics	*Details*
Nomenclature	Simulator, Hand Grenade, M116A1
NSN	1370-00-752-8124
Body/Colors and Markings	Kraft paper / white overall with label and black markings
Total Weight	3.2 ounces
Pyrotechnic Charge	Photoflash powder
Functioning Time	Burst 5–10 seconds after ignition
Effect	Explosive blast
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-16. M116A1 hand grenade simulator

ILLUMINATION GROUND SIGNAL KITS

4-25. The pen gun flare supports the small-unit leader in fire control, maneuver, and initiating operations such as ambushes. Use these signals for evasion steps for rescue, for securing visual detection, or for identifying ground locations for aircraft. The pen gun flare comes in two kits, the M185 or M186 (personnel signal kit) and the M260 (red personnel distress signal kit).

4-26. When employing illumination ground signal kits, fire team members or isolated personnel know the proper use of each device and take precautions to ensure safe employment. The immediate area must be free of debris that may catch fire, and overhead clearance is suitable for an obstacle-free path to shoot through. Information on illumination ground signal kits can be referenced in figure 4-17 and 4-18 on pages 4-27 and 4-29.

WARNINGS

At close-range, these signals can injure or kill if they strike a person.

When signaling an aircraft, DO NOT aim directly at the aircraft; the signals, regardless of color, may appear to be small arms fire.

While the flares are small and usually burn out before reaching the ground, they can ignite fires.

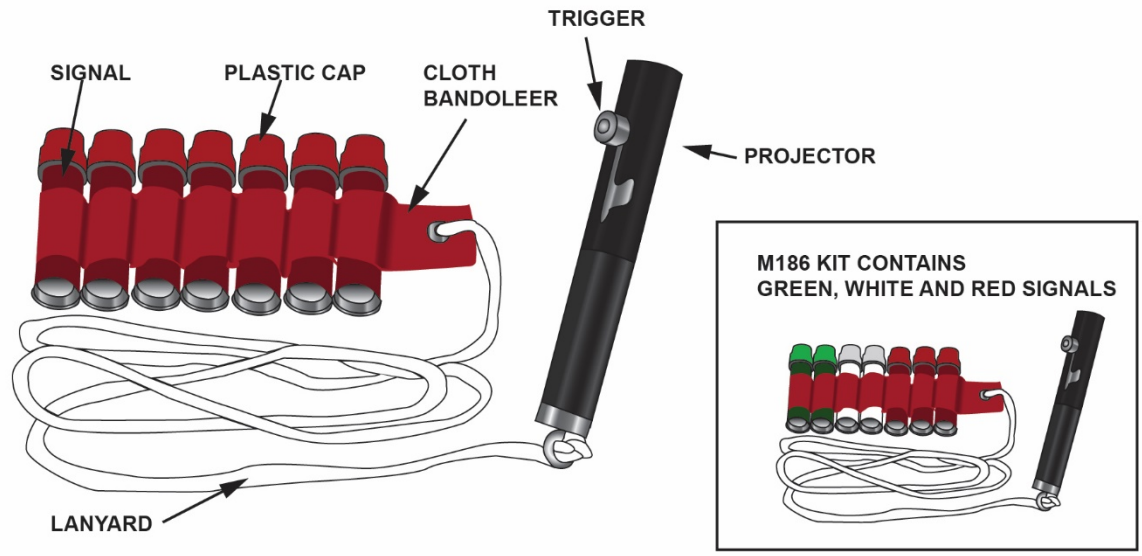
M185 AND M186 PERSONNEL SIGNAL KITS

4-27. Each of these kits consists of one handheld projector, seven ground illumination signals, and an instruction sheet in a moisture vapor-proof barrier hag. (See figure 4-17.) Kit M185 contains seven red ground illumination signals M187. Kit M186 contains three red ground illumination signals M187, two green ground illumination signals M188, and two white ground illumination signals M189. The signals are held in a pressure-sensitive tape bandoleer connected to the projector by a 36-inch lanyard. The projector body has internal threads at each end. An aluminum plug cap with a stainless-steel eyebolt is threaded and staked to one end. The plug cap and lower portion of the projector body are knurled. A combination safety and firing slot is cut into the upper portion of the body. A stainless steel, spring-loaded firing pin is assembled inside the projector body. A stainless-steel, knurled trigger screw affixes to the firing pin.

4-28. Three signals may be fired from a handheld projector while in a bandoleer:

- M187 red illumination ground signal.
- M188 white illumination ground signal.
- M189 green illumination ground signal.

DODIC L116 / L117	*M185 and M186 Personnel Signal Kits*
Use the pen gun flare primarily as a distress-signaling device by isolated personnel. The pen gun flare has a threaded projector with the projectiles contained in a cloth bandoleer. The projector, the bandoleer, and seven projectiles or signals make up the signal kit. All signals may be obtained and fired separately.	



Components and Characteristics	*Details*
Nomenclature	Signal Kits, Personnel, Distress: Red, M1895 and various colors, M186
NSN	M185 / 1370-00-921-6172 M186 / 1370-00-926-9387
Body/Colors and Markings	Aluminum / black projector: anodized color coding on signals
Total Weight	6.24 ounces
Filler	Illuminant composition
Burning Time	5 seconds
Candlepower	3,200
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-17. M185 and M186 personnel signal kits

4-29. To operate the M185 or the M186 personnel signal kit—

- Select the desired firing signal by color (if using the M186 pen flare kit). If the bandoleer contains more than one signal of the chosen color, use the one farthest from the lanyard.
- Remove and discard the plastic cap.
- Cock the projector by moving the trigger to the safety slot.
- Carefully thread the projector onto the signal. Take care not to dislodge the trigger from the safety slot.
- Aim in the chosen direction.

- Fire by moving the trigger to the bottom of the slot and releasing it with a snap. If the expended signal is on the end of the bandoleer or if the signals between the expended signal and the end have been used, cut the bandoleer, and discard the waste.
- Return the partly used kit to the carrier bag, and seal with tape.

M260 Red Personnel Distress Signal Kit

4-30. The kit comes equipped with a hand-fired projector and a bandoleer assembly, which contains a plastic molded bandoleer holding seven red signals. (See figure 4-18.) The signals consist of small solid propellant rocket motors actuated by a percussion primer, a delay element, and a pyrotechnic candle in a metal case. The surface of the case is dyed red to match the color of the candle. The projector is black anodized aluminum and has a signal-gripping device and a firing mechanism. The firing mechanism consists of a free-traveling firing pin with a smooth actuation knob and spring. The projectile connects to the bandoleer by a 30-inch lanyard.

4-31. This kit contains only red illumination ground signals. The signals in this kit are more powerful than signals in the M185 and M186 personnel signal kits. They have a more powerful propellant allowing a higher probability of penetration through overhead foliage. The burning time for these signals is 10 seconds at 10,000 candlepower.

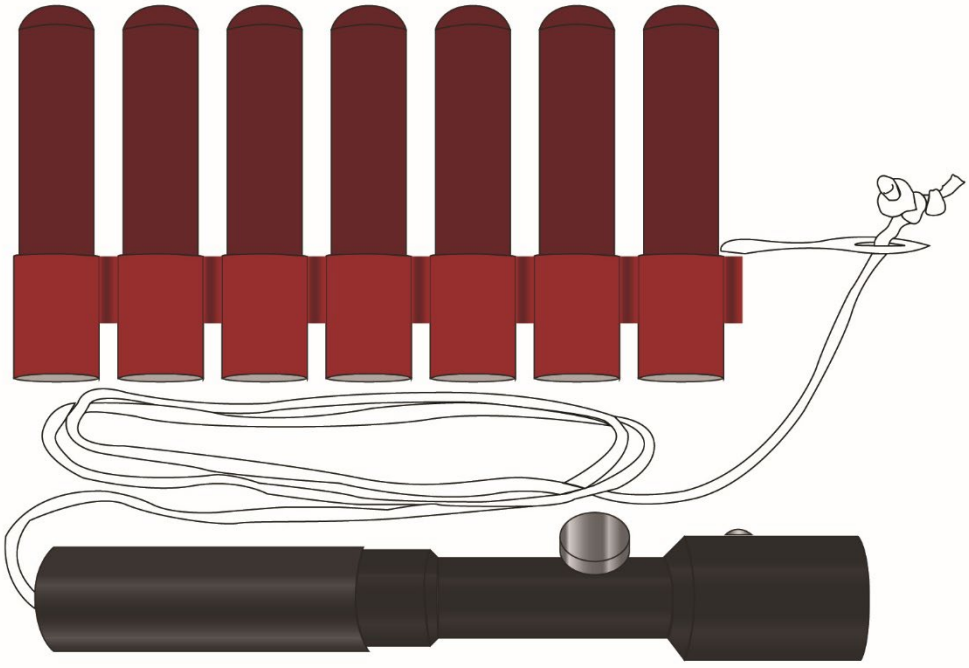
WARNINGS

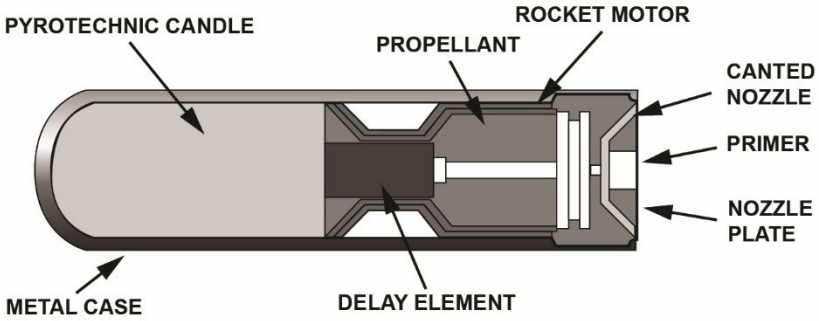
At close-range, these signals can injure or kill if they strike a person.

When signaling an aircraft, DO NOT aim directly at the aircraft; the signals, regardless of color, may appear to be small arms fire.

While the flares are small and usually burn out before reaching the ground, they can ignite fires.

DODIC L119	*M260 Red Personnel Distress Signal Kit*
Use this kit primarily as a distress-signaling device by isolated personnel who are exposed to emergency escape and evasion situations. The pen gun flare has a force-fitted projector and a plastic bandoleer. The projector, the bandoleer, and seven signals make up this kit.	





Components and Characteristics	*Details*
Nomenclature	Signal Kit, Personnel Distress: Foliage Penetrating, Red, M260
NSN	1370-00-490-7362
Body/Colors and Markings	Aluminum / black projector: anodized color coding on signals
Total Weight	3.2 ounces
Filler	Illuminant composition
Burning Time	10 seconds
Candlepower	10,000
Legend: DODIC – Department of Defense identification code, NSN – national stock number	

Figure 4-18. M260 red personnel distress signal kit

4-32. To operate the M260 distress signal kit—

- Select the signal to fire.
- Firmly insert the nozzle end of the signal into the projector until signal bottoms out.
- Aim in the chosen direction.
- Fire by moving the trigger to the bottom of the slot and releasing it with a snap.
- If the expended signal is on the end of the bandoleer or if the signals between the expended signal and the end have been used, cut the bandoleer, and discard the waste.
- Return the partly used kit to the carrier bag, and seal with tape.

Chapter 5
Employment

Grenades and pyrotechnics supplement direct fire weapons systems, deliver devastating lethal effects, enable maneuver, and provide alternate signal sources. To employ these special-purpose weapons and pyrotechnic devices, the Soldier must understand and master the associated munition's and device's employment procedures. Chapter 5 provides the employment details of all hand grenades and pyrotechnics discussed within this training circular. This chapter covers the ROE and types of operations in which to use each device, and employment considerations.

RULES OF ENGAGEMENT

5-1. To properly employ any type of hand grenade or pyrotechnic signal, Soldiers must know the—

- Characteristics and capabilities of the chosen grenade or pyrotechnic.
- Location of all friendly forces.
- Sector of fire.
- Projected arc or path of the grenade or pyrotechnic, ensuring the arc or path is unobstructed.
- Direction of the wind (when employing handheld and ground smoke signals).

5-2. Soldiers should use the buddy- or fire-team system when employing grenades and pyrotechnics. For example, one Soldier can provide covering fire; or as a combined team, Soldiers can employ grenades on the target and ground smoke within the target area.

CONSIDERATIONS

5-3. When employing any type of hand grenade or pyrotechnic signal, Soldiers must ask themselves the following questions:

- What types of grenades do the ROE permit and restrict?
- What is the desired effect (for example, kill, stun, obscure, destroy equipment, or mark a location)?
- Does the structural integrity of the room and building permit the types of grenades selected for use?

5-4. Soldiers should consider wind direction and speed before employing smoke grenades:

- Throw grenades upwind of the desired location.
- Lack of wind and heavy humidity can cause smoke to linger. Heavy concentrations of smoke can obscure obstacles, restrict friendly movements, and hide an enemy's location.
- DO NOT throw smoke grenades on dry tinder.

WARNING

DO NOT use fragmentation or blast overpressure-concussion grenades in buildings that have walls of thin veneer material. Fragmentation grenade particles can penetrate partitioned walls, and blast overpressure-concussion grenades can weaken the structure of the building or cause portions of the building to collapse inward.

- Will the scheme of maneuver permit the use of fragmentation grenades and not cause fratricide?
- Will the type of grenade used cause a fire in an undesired location?

OFFENSIVE OPERATIONS

5-5. The fragmentation hand grenade is the primary type of grenade used during offensive operations; however, offensive operations can also involve the use of offensive and stun hand grenades. These operations include clearing—

- Confined spaces.
- Trenches.
- Bunkers.
- Rooms.
- Entrenched positions.

CONFINED SPACES

5-6. Lethal offensive blast overpressure and nonlethal concussion hand grenades are preferred for confined space engagements, such as bunkers, rooms, buildings, or fortified areas, where lethal fragments may not meet the mission requirements. The shock waves (overpressure) produced by the offensive hand grenade when employed in enclosed/restrictive areas is greater than that produced by the M67 fragmentation grenade, making it more effective against enemy soldiers located in bunkers, rooms, buildings, and fortified areas. Whereas the nonlethal stun (concussion) hand grenade is preferred for use during hostage rescue and to incapacitate threats during room clearing when lethal effects are prohibited by the rules of engagement or mission requirements. The selection of a grenade type, however, depends upon mission analysis and availability of each type of capability to support the mission.

WARNING

The blast overpressure-concussion produced by offensive grenades in enclosed areas is greater than those produced by fragmentation grenades and may weaken or collapse a structured foundation.

TRENCHES

5-7. A mix of fragmentation grenades and offensive grenades should be used to clear enemy-fortified trenches: fragmentation grenades to gain and clear the enemy's trench lines, and offensive grenades to clear and destroy any fortified positions. (See ATP 3-21.8 for detailed instruction.)

WARNING

To ensure the safety of squad members during tactical operations, Soldiers employing fragmentation grenades alert others by shouting FRAG OUT or BLAST OUT before throwing the grenade. If stealth is a factor, using hand and arm signals or a prearranged signal will be used to alert team members of the pending employment of a lethal capability.

BUNKERS

5-8. Use a mix of fragmentation and offensive grenades to clear bunkers: fragmentation grenades to suppress enemy fires during movement, and a mix of fragmentation and offensive grenades to destroy fortified positions. (See ATP 3-21.8 for detailed instructions.)

WARNING

To ensure the safety of squad members during tactical operations, Soldiers employing fragmentation grenades alert others by shouting FRAG OUT or BLAST OUT before throwing the grenade. If stealth is a factor, using hand and arm signals or a prearranged signal will be used to alert team members of the pending employment of a lethal capability.

ROOMS

5-9. The following is an example of how a squad clears a room using hand grenades:

- The squad leader and assaulting fire team approach the room and position themselves at either side of the entrance.
- A Soldier of the assaulting fire team "cooks off" a fragmentation or blast overpressure-concussion grenade for 2 seconds maximum (one thousand one, one thousand two), shouts FRAG OUT or BLAST OUT to alert friendly personnel, and then throws the grenade into the room.

DANGER

Soldiers must be conscious of features within the room to be cleared. Grenades tend to roll down stairs. This can nullify the desired effect(s) or cause friendly casualties.

WARNING

Conduct a structural analysis before using fragmentation or blast overpressure-concussion grenades to clear rooms of a building. Grenade fragments can penetrate walls and cause injury to the clearing team. Blast overpressure-concussion grenades may weaken the structure, causing part or all of the building to collapse on the clearing team.

CAUTION

If using a stun grenade for room clearing, do not "cook off" the grenade. The stun grenade has a fuze delay time of (1.0 to 2.3 seconds); the thrower does not have adequate time to dispose of the grenade before it explodes. This can cause serious injury or death to the thrower and friendly personnel nearby.

Note. If stealth is a factor, using hand and arm signals or a prearranged signal will be used to alert team members of the pending employment of a lethal capability.

- After the grenade explodes, the lead Soldier on the clearing team enters the room, eliminates any immediate threat, and moves to the point of domination.
- The remainder of the clearing team enters the room and moves to their points of domination, eliminating any threat.
- Once cleared, the team marks the room, according to the unit SOP.

Note. Refer to ATP 3-21.8 for detailed instructions on how a squad clears a room with the use of grenades.

ENTRENCHED POSITIONS

5-10. Against enemy soldiers in open trenches or fighting positions, Soldiers should throw a fragmentation grenade, so it bursts over the target, and throw the offensive blast overpressure-concussion grenade, so it bursts at ground level. If the targets are on sloping ground, Soldiers should use aboveground detonation to prevent the grenade from rolling away from the target before detonating. Aboveground detonation also prevents the enemy from securing the grenade and throwing it back within the 4.0- to 5.5-second fuze delay. (See Chapter 3 for more information about aboveground detonation and "cook off" procedures.)

DEFENSIVE OPERATIONS

5-11. The fragmentation grenade is the primary hand grenade used in defensive operations. When used with other weapons, it can destroy remnants of an attacking enemy force that may succeed in penetrating more distant barriers and final protective fires. The fragmentation hand grenade further disrupts the continuity of the enemy attack, demoralizes the enemy soldier, and forces the enemy into areas covered by direct-fire weapons, such as rifle, machine gun fire, and Claymore munitions. Using fragmentation hand grenades on dismounted enemy forces at a critical moment in the assault can be the final blow in taking the initiative away from the enemy. (See ATP 3-21.8 for more information regarding the use of grenades in defensive operations.)

DEFENSE FROM INDIVIDUAL FIGHTING POSITIONS

5-12. Used from individual fighting positions, fragmentation hand grenades can cover close-in dead space. Soldiers should use these grenades with ground flares along the front of their defensive positions. Potential avenues of approach through the unit's perimeter should be marked with a reference to identify them as primary hand grenade targets.

EMPLOYMENT RULES FROM FIGHTING POSITIONS

5-13. The following rules apply when employing fragmentation hand grenades from fighting positions:

- Clear overhead obstructions that may interfere with the path of the thrown grenade. Do this while simultaneously clearing direct-fire fields of fire.
- Rehearse grenade employment; know where the primary target is located.
- Keep 50 percent of the fragmentation grenades at the ready in the fighting position, leaving the remaining fragmentation grenades on the load-bearing equipment.
- Rehearse actions needed if an enemy grenade lands in the fighting position.
- Employ fragmentation hand grenades against enemy soldiers located in defilade positions as a priority. Doing so lessens the danger to friendly Soldiers and helps cover terrain not covered by direct-fire weapons.
- Reconnoiter alternate and supplementary positions and determine the priority for the fragmentation hand grenade target.

WARNING

Grenade fuze time delays can vary. If an enemy grenade lands in the position, immediately evacuate the fighting position, and lie flat on the ground.

RETROGRADE OPERATIONS

5-14. Most of the employment considerations applicable to the use of hand grenades and pyrotechnics in the defense are equally applicable to retrograde operations. Considerations unique to retrograde operations relate to creating obstacles, marking friendly force locations, breaking contact, and communicating.

CREATE OBSTACLES

5-15. When terrain conditions permit, Soldiers can use incendiary grenades to impede and disrupt enemy movement by initiating fires in specific areas.

MARK LOCATIONS

5-16. Soldiers can use prearranged smoke colors to mark friendly force positions and identify friendly forces. Typically, the unit SOP determines these signals and markings.

BREAK CONTACT

5-17. During retrograde operations, some elements of the friendly force may become decisively engaged. Soldiers can use fragmentation, white smoke, and tear gas (known as CS) grenades to break contact and regain freedom of maneuver. Using fragmentation grenades in volley fire following the employment of white smoke is especially effective; the smoke obscures enemy observation of friendly force movement from covered positions, and the fragmentation grenades force the enemy to cover.

COMMUNICATIONS

5-18. Soldiers can use prearranged hand-employed colored smoke grenades (green, yellow, red, or violet) and/or handheld pyrotechnic signals to conduct ground-to-ground and ground-to-air communication with adjacent and air supporting friendly forces.

URBAN OPERATIONS

5-19. Urban areas house large quantities of people and contain large numbers of buildings. The enemy may be intermingled with noncombatants, and collateral damage must be limited. Because of these factors, the ROE may be more restrictive than under other combat conditions. Figure 5-1 outlines the guidelines for hand grenade employment. (See ATTP 3-06.11 for use of grenades and pyrotechnics in urban areas.)

TYPE OF HAND GRENADE	*EMPLOYMENT*
Nonlethal	Use when noncombatants and friendly forces may be intermingled with threat forces. Throw into rooms before entering to cause confusion and hesitation (especially useful if the structural integrity of the building does not permit the use of fragmentation or blast-overpressure grenades).
Chemical	Use during urban operations to maintain control (riot control) or for incendiary purposes. Employed only when command directed.
Fragmentation	Throw at assaulting enemy troops between buildings or on streets or from windows, doors, or manmade apertures. Employed only when command directed.
Offensive	Provides limited 2 meters effects in open terrain. The shock waves (overpressure) produced by the grenade when used in enclosed areas is greater than that produced by the M67 fragmentation grenade, making it more effective against enemy soldiers located in bunkers, buildings, and fortified areas.
Ground Smoke Signal	The M18 smoke hand grenade (green, yellow, red, and violet) is used for signaling ground-to-ground and ground-to-air marking. The AN-M8 HC and M83 TA smoke hand grenades are used for screening and obscuring the tactical small unit. The M106 SOD-Vr is a near instantaneous bursting-type smoke used to break the enemy line of sight, or it can be used in tandem with the AN-M8 HC or M83 TA smoke hand grenades for a long duration obscuration screen of 105–125 seconds.
Legend: HC – hexachloroethane-zinc, SOD-Vr – screening obscuration device–visual restricted terrain, TA – terephthalic acid	

Figure 5-1. Hand grenade employment during urban operations

WARNING

Using the M83 TA or M106 SOD-Vr white smoke hand grenades, M18 colored-smoke hand grenades, or any other chemical-type smoke or special-purpose hand grenade are harmful to personnel and may cause fires inside of confined spaces. These chemical-smoke hand grenades employed inside buildings may displace oxygen in poorly ventilated rooms and make breathing difficult, while also rendering protective masks ineffective.

AIR OPERATIONS

WARNING

DO NOT throw fragmentation or offensive grenades from low-flying or hovering helicopters. The fragments present a hazard to the aircraft and its passengers.

5-20. Generally, throwing hand grenades from medium- or high-flying helicopters is limited to mission-critical situations. Leaders must consider the factors of risk that may occur if employment is necessary.

LIMITED VISIBILITY

5-21. Depth perception is generally impaired under limited-visibility conditions. Throwers must have clear fields of fire with no overhead obstructions.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR

5-22. Wearing gloves, especially gloves used during a chemical, biological, radiological, and nuclear (CBRN) environment, inhibits throwers' sense of feel and could decrease their throwing ability and range. The thrower should execute arming and throwing procedures carefully and concentrate on using the proper grip. Observing each arming action of the removal of safety clip, disengagement of the pull ring from the confidence clip (if equipped), and safety pin is recommended in CBRN training environments. If time permits, have a fellow Soldier observe and talk you through the arming procedure step by step, starting with the proper grip, safety clip removal, pull ring disengagement from the confidence clip, pull ring and safety pin extraction, and employment.

Appendix A

Hazard Classification and Identification Codes

Appendix A deals primarily with the special considerations of the proper way to store and transport grenades and pyrotechnics using the correct marking for vehicles and storage areas. This appendix will discuss what and where to look on grenades or pyrotechnics to identify the characteristics of each munition. The unit ammunition manager must forecast the ammunition requirement for any upcoming ranges and, in turn, must coordinate for specific lift assets with the unit battalion or brigade logistics staff officer (S-4).

HAZARD CLASSIFICATIONS

A-1. The Fire Divisions and Hazard Classifications for stored and transported munitions use the following definitions:

- Fire Division 1, Hazard Class 1.1—Large quantity explosive charges that, when ignited, cause a mass detonation of the adjoining ammunition. Items in this division are field artillery bags propelling charges, demolitions charges, and TNT. There will be few secondary explosions that will be much smaller than the initial detonation.
- Fire Division 2, Hazard Class 1.2—Items configured for storage and transportation that do not mass detonate when a single item or package in a stack is ignited fall within this division. Explosions involving the items result in their burning and exploding progressively with no more than a few at a time reacting. These reactions will project fragments and unexploded items from the explosion site. Blast effects are limited to the immediate vicinity and are not the primary hazard. Typically, main gun ammunition (25-millimeter [mm], 120-mm), as well as 40-mm with explosive fillers (high-explosive, dual-purpose) are in this division.
- Fire Division 3, Hazard Class 1.3—Includes items that burn vigorously and do not usually extinguish in emergencies. Explosions normally are confined to pressure ruptures of containers and do not produce propagating shock waves or damaging blast overpressure beyond the magazine distance. The distribution of burning container materials, propellant, or other flaming debris may cause a severe hazard of spreading fire.
- Fire Division 4, Hazard Class 1.4—Present a fire hazard with minimal blast, fragmentation, or toxic hazards. Small arms ammunition with no incendiary devices falls within this division.

A-2. Units should refer to the Ammunition Book Complete, typically called the Yellow Book, for a detailed listing of hazard classifications by ammunition Department of Defense identification number (known as DODIC). The link to the Yellow Book is listed in the reference section of this publication. (For more information on the Yellow Book, refer to the Defense Ammunition Center and the U.S. Army Technical Center for Explosive Safety website.) Installation ammunition supply points (ASPs) will assist units identify the required placards for transportation and storage.

A-3. Figure A-1 on page A-2 describes the ammunition placards based on fire division and hazard class, according to DESR 6055.09, edition 1. Included are the associated ordering (national stock number [NSN]) information based on location of the placard (building, 24 inches; or vehicle, 12 inches, respectively). All placards are designed with orange backgrounds with black lettering.

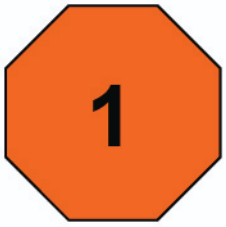
FIRE PLACARD	HAZARD PLACARD	REMARKS
24" Storage within structures or buildings.	12" Placement on all sides of vehicles during transport.	
 NSN 7690-01-082-0290	NSN 7690-01-081-9581	MASS DETONATION. THE AMMUNITION DURING A FIRE IN STORAGE OR TRANSPORT WILL RESULT IN A MASS DETONATION.
NSN 7690-01-082-0289	NSN 7690-01-087-7340	EXPLOSION WITH FRAGMENTS. THE AMMUNITION DURING A FIRE IN STORAGE OR TRANSPORT WILL RESULT IN AN EXPLOSION WITH PROJECTILE FRAGMENTS.
NSN 7690-01-081-9583	NSN 7690-01-081-9582	MASS FIRE. THE AMMUNITION IN STORAGE OR TRANSPORT WILL CAUSE A MASSIVE FIRE WHEN IGNITED.
NSN 7690-01-082-6709	NSN 7690-01-081-9584	MODERATE FIRE. THE AMMUNITION IN STORAGE OR TRANSPORT WILL CAUSE A MODERATE FIRE WHEN IGNITED.
Legend: " - inch		NSN - national stock number

Figure A-1. List of transportation and storage placards

LOGISTIC IDENTIFICATION CODES

A-4. For logistics agencies to provide the right munition to the right organization for the firer, munitions include various identification codes. These logistic codes are interconnected to some degree, where one code may contain one or two other codes. The following logistic identification codes facilitate requesting unit order processes, as well as leader and firer identification of the munitions:

- Federal supply classification (known as FSC).
- NSN.
- DODIC.
- Department of Defense ammunition code (known as DODAC).

A-5. The following sections discuss these four basic codes in general terms, as they apply to the unit, leader, and firer.

FEDERAL SUPPLY CLASSIFICATION

A-6. Conventional ammunition falls within FSC code starting with "13." The FSC code identifies the type of supply as ammunition, depicted by the first two digits of the four-digit FSC code; 13XX. Within this group, two more numbers that identify the general type or family in which the item falls further break down ammunition.

A-7. Figure A-2 lists the FSC codes for all ammunition types typical to training and combat. These numbers are used frequently when ordering, reporting, stocking, forecasting, issuing, and turning in ammunition at the brigade level and above. Additionally, the FSC is used as part of the national stock number, DODAC, as described later in this appendix. Additionally, the FSC group is used in equipment technical manuals.

FEDERAL SUPPLY CODE (GROUP 13)	*AMMUNITION AND EXPLOSIVE TYPE OR FAMILY*
1305	Ammunition less than 30 millimeters (mm)
1310	Ammunition 30-mm through 75-mm
1315	Ammunition 75-mm through 125-mm
1320	Ammunition over 125-mm
1330	Grenades
1340	Rockets and rocket ammunition
1345	Land mines
1365	Military chemical agents
1370	Pyrotechnics
1375	Demolition materials

Figure A-2. Federal supply classification

NATIONAL STOCK NUMBER

A-8. Each complete round or item of conventional ammunition or associated explosive component is identified by its own NSN. The basic components of national stock numbers are—

- FSC.
- FSC group.
- FSC class.
- National codification bureau country code.
- Item Number.

A-9. The first four numbers of the NSN contain the FSC code. It is followed by the national item identification number that consists of a two-number code identifying the country of manufacture and seven number item identification. See figure A-3 for an example NSN.

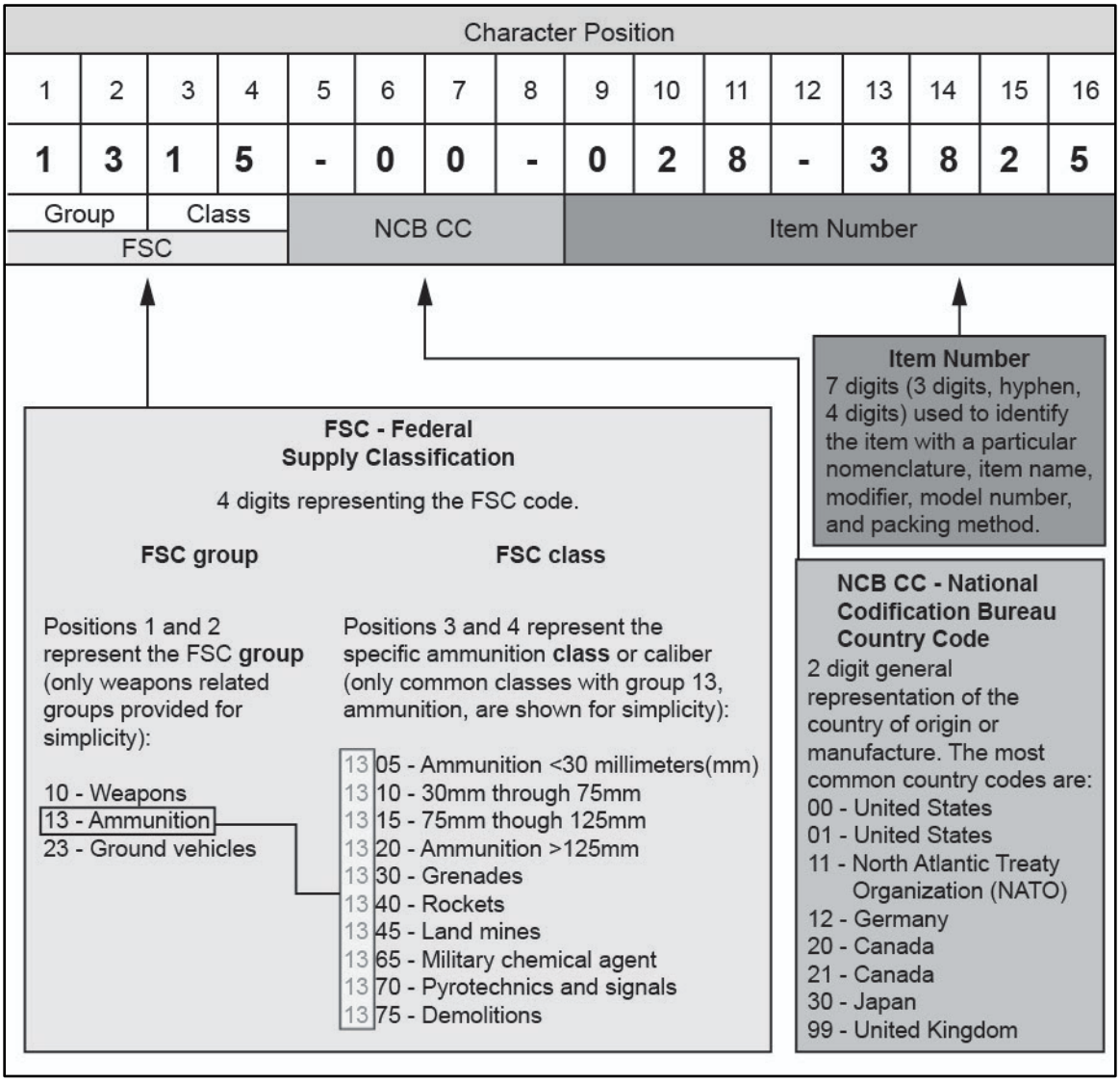

Character Position
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1 3 1 5 - 0 0 - 0 2 8 - 3 8 2 5
Group
Class
FSC
NCB CC
Item Number
Item Number
7 digits (3 digits, hyphen, 4 digits) used to identify the item with a particular nomenclature, item name, modifier, model number, and packing method.
FSC - Federal Supply Classification
4 digits representing the FSC code.
FSC group
FSC class
Positions 1 and 2 represent the FSC group (only weapons related groups provided for simplicity):
10 - Weapons
13 - Ammunition
23 - Ground vehicles
Positions 3 and 4 represent the specific ammunition class or caliber (only common classes with group 13, ammunition, are shown for simplicity):
13 05 - Ammunition <30 millimeters(mm)
13 10 - 30mm through 75mm
13 15 - 75mm though 125mm
13 20 - Ammunition >125mm
13 30 - Grenades
13 40 - Rockets
13 45 - Land mines
13 65 - Military chemical agent
13 70 - Pyrotechnics and signals
13 75 - Demolitions
NCB CC - National Codification Bureau Country Code
2 digit general representation of the country of origin or manufacture. The most common country codes are:
00 - United States
01 - United States
11 - North Atlantic Treaty Organization (NATO)
12 - Germany
20 - Canada
21 - Canada
30 - Japan
99 - United Kingdom

Figure A-3. National stock number reference card

DEPARTMENT OF DEFENSE IDENTIFICATION CODE

A-10. The DODIC is a four-digit code that quickly identifies a specific munition by caliber and type. It is used at the unit level to identify the specific cartridge type and configuration used in training and combat by the assigned weapons or systems.

A-11. The FSC code (the first four digits of the NSN) determines the first position (prefix) lettering code for the DODIC. For example, for DODIC A555, the first position character is determined by the munition's FSC, 1305, ammunition less than 30-mm. For newer designed munitions, the second position is also a capital letter. Use of the second position with a letter provides for 2,600 separate munition types per FSC group compared to 1,000 using numbers 0 to 9. Figure A-4 provides a general standard structure of ammunition DODICs.

Character Position

1	2	3	4
A	B	8	6
Federal Supply Class (FSC) Group Identifier	Munition Sequence Code		

FSC Group 13	Ammunition and Explosive Type	FSC Group Identifier	Munitions Sequence Code
1305	Ammunition <30 millimeters(mm)	A	Munition Sequence Code is a three-digit code represented by the sequence **$ # #** with the $ able to be a letter or number (A-Z or 0-9), and # representing a number only (0-9).
1310	30mm through 75mm	B	
1315	75mm though 125mm	C	
1320	Ammunition >125mm	D	
1330	Grenades	G	
1340	Rockets	H, P, W	
1345	Land mines	J, K	
1365	Military chemical agent	K	
1370	Pyrotechnics and signals	L	
1375	Demolitions	M	

Figure A-4. Department of defense identification code, example

DEPARTMENT OF DEFENSE AMMUNITION CODE

A-12. The Department of Defense uses DODACs for logistics management of ammunition (see figure A-5). DODACs include the munition's FSC and its assigned DODIC. The code is used on unit DA Form 581s (*Request for Issue and Turn-in of Ammunition*), DA Form 3151-Rs (*Ammunition Stores Slip*), and most ammunition reports. The DODAC is used instead of the DODIC to reduce errors with ammunition transactions when ordering at brigade level and above.

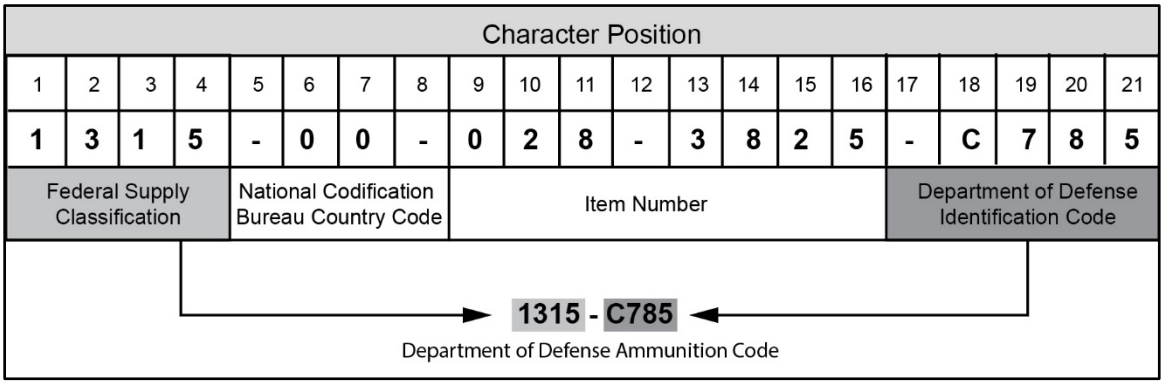

Character Position
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
1 3 1 5 - 0 0 - 0 2 8 - 3 8 2 5 - C 7 8 5
Federal Supply Classification
National Codification Bureau Country Code
Item Number
Department of Defense Identification Code
1315 - C785
Department of Defense Ammunition Code

Figure A-5. Department of defense ammunition code, example

COLOR CODING

A-13. Color-coding helps to visually identify the characteristics of each munitions and its purpose in training or the operational environment. Understanding the color-coding provides the thrower the ability to acquire the munition, identify its purpose, and employ its capability to enhance the overall effects on the battlefield.

A-14. The areas that hold the most significant places to observe color-coding is the body. Generally, it will contain olive drab, unless its use is special in nature; then the body may have a different color associated with it. Another area of interest is in the markings or letters sprayed on the body; the color may depict the characteristics of the filler that is contained within the grenade body. Refer to MIL-STD 709D or TM 9-1330-200-12 for additional ammunition color coding information. (See figure A-6.)

COLOR	*FEDERAL STANDARD*	*REMARKS*
Olive Drab Green	FS 34087	Only significance of color is for camouflage purposes.
Yellow	FS 33538 Orange Yellow	Identifies high explosive (HE) ammunition or indicates the presence of an HE.
Brown	FS 30117 or FS 30140	Identifies low explosive items or components or indicates the presence of a low explosive, such as rocket propellant.
Gray	FS 36231 Dark Gull Gray	Identifies chemical containing a toxic chemical, incapacitating, or riot control agent.
Light Red	FS 31158	Identifies incendiary or indicates the presence of highly flammable material (liquids, jellies, solids), designed to produce damage by fire.
Dark Red	FS 31136 Insignia Red	Identifies a riot control agent filler.
Light Green	FS 34558 or FS 34449	Indicates screening or marking smoke.
Dark Green	FS 34108 Medium Green	Identifies a toxic chemical agent filler.
Violet	FS 17100 Purple	Identifies an incapacitating agent filler.
Silver/Aluminum	FS 17178	Identifies countermeasure ammunition, such as radar echo and/or leaflets.
White	FS 37875 Insignia White	Identifies illuminating, designed to produce a colored light.
Light Blue	FS 35109 Dark Blue	Identifies training ammunition.
Bronze/Gold/Brass	FS 17043	Identifies completely inert ammunition designed for use in activities such as assembly, testing, handing, drills, and so forth, and not designed to be delivered in a delivery system.

Figure A-6. Color coding list

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Appendix B

Inspection and Storage

Hand grenades and pyrotechnics require additional safeguards to ensure the serviceability and proper functionality of munitions prior to employment. Visual inspections allow the unit to observe and examine each munition to prevent the use of defective grenades and pyrotechnics in accordance with STP 21-1-SMCT and TM 9-1330-200-34.

Appendix B outlines a method that units should exercise when receiving all types of munitions upon initial draw of ordinance. This section will cover how to evaluate and identify defects when inspecting the interior or exterior of shipping containers, grenade canisters, and grenades.

HAND GRENADE INITIAL INSPECTION

B-1. Soldiers should perform three types of inspection to ensure the serviceability of the grenade or pyrotechnic. These types of checks include—

- Initial inspection.
  - Wooden shipping containers.
  - Grenade canisters.
  - Grenade body and fuze.
- Before storing.
  - Safety clip.
  - Inspection points.
- Daily checks.
- Storage.

WARNING

Hand grenades—like any other weapon—require inspection before use and proper securing to avoid serious injury or death.

Note. See STP 21-1-SMCT and TM 9-1330-200-12 for more information about hand grenade inspection. These inspections emphasize the M67 fragmentation grenade; however, all grenades with fuzes require inspection.

WOODEN SHIPPING CONTAINERS

B-2. When shipped in bulk, hand grenades come secured in wooden shipping containers with either a factory or an ASP seal (see figure B-1). Personnel should inspect the shipping container upon receipt. DO NOT open damaged shipping containers; return them to the ASP or dispose of them using the methods outlined in the unit SOP.

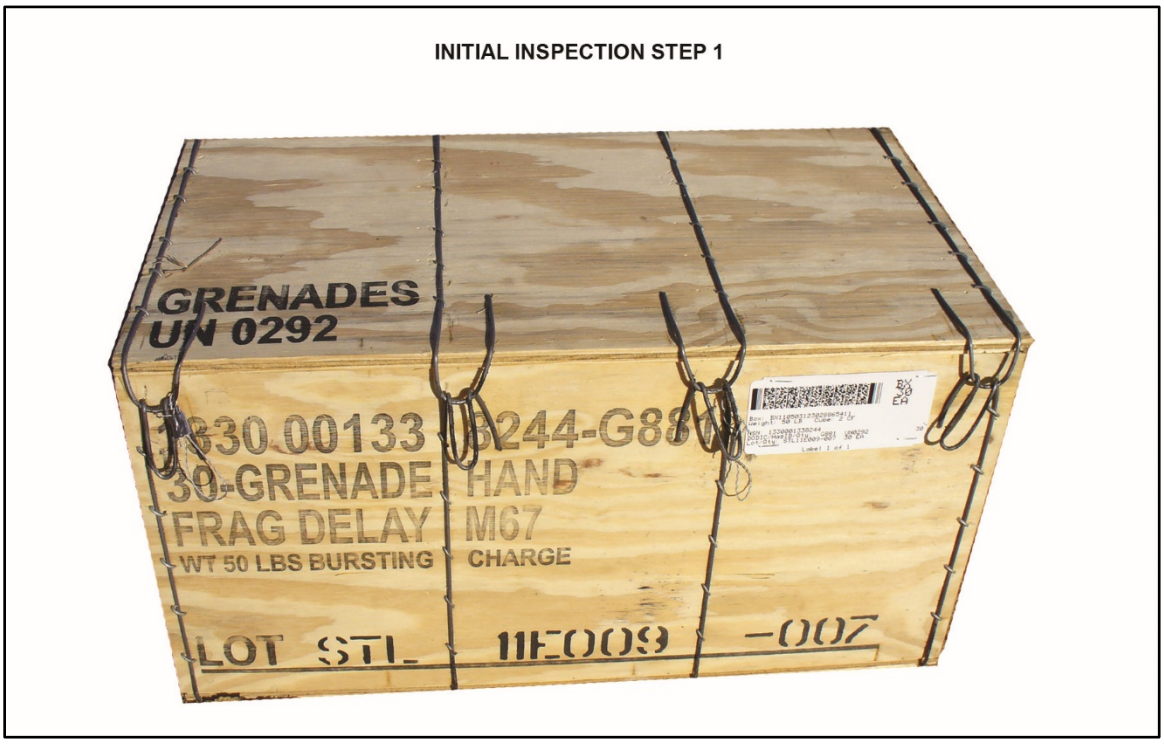

Figure B-1. Hand grenade wooden shipping container

CANISTERS

B-3. Individual canisters house each grenade within the shipping container (see figure B-2). Issue hand grenades in their individual shipping canisters or unpacked. To mitigate risk during live bay operations, hand grenade issuing in live bay will be in accordance with units' SOP and/or local policies.

B-4. Upon removing the sealed individual canisters from the shipping container, personnel should inspect the canisters and identify any of the following discrepancies:

- Damage to the canister.
- Missing or tampered seal on the canister.

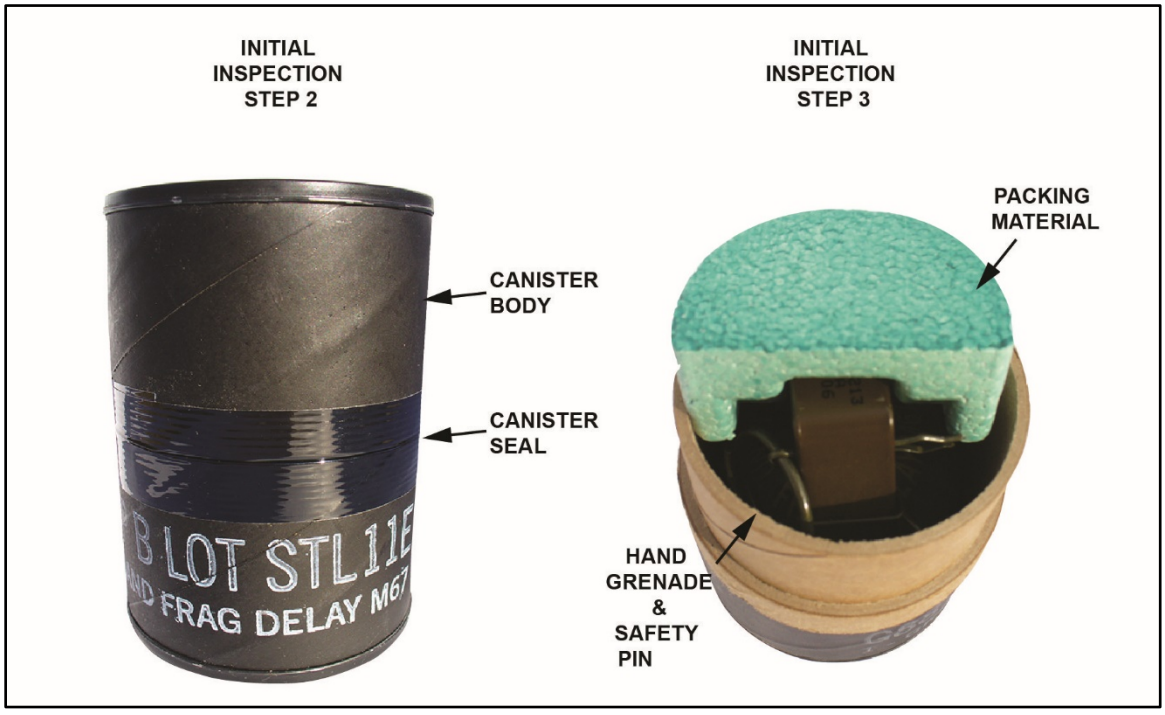

Figure B-2. Hand grenade shipping canister with packing material

B-5. Once the canister has been opened, but before removing the packing material (see figure B-2), personnel should inspect the grenade and identify any of the following discrepancies:

- Upside down hand grenade inside of the shipping canister.
- Improperly attached or missing safety pins.

B-6. Personnel should then remove the packing material and the grenade from the canister. Once the packing material and the grenade has been removed from the canister (see figure B-3, page B-4), personnel should inspect the grenade and identify any of the following discrepancies:

- Rust on the body or the fuze.
- Visible holes in the body or the fuze.
- Tight fuze and no gap between the fuze and the grenade body.
- Presence of safety-lever hinge ears (see figure B-3 [7]), page B-4, seated under the fuze lug (see figure B-3 [6], page B-4); the hinge ears should pass the fuze centerline and be pointing upward.

Note. If any of the discrepancies are found upon receipt of newly issued hand grenades, personnel should return the grenade and shipping canister to the issuing person or dispose of it according to the unit SOP.

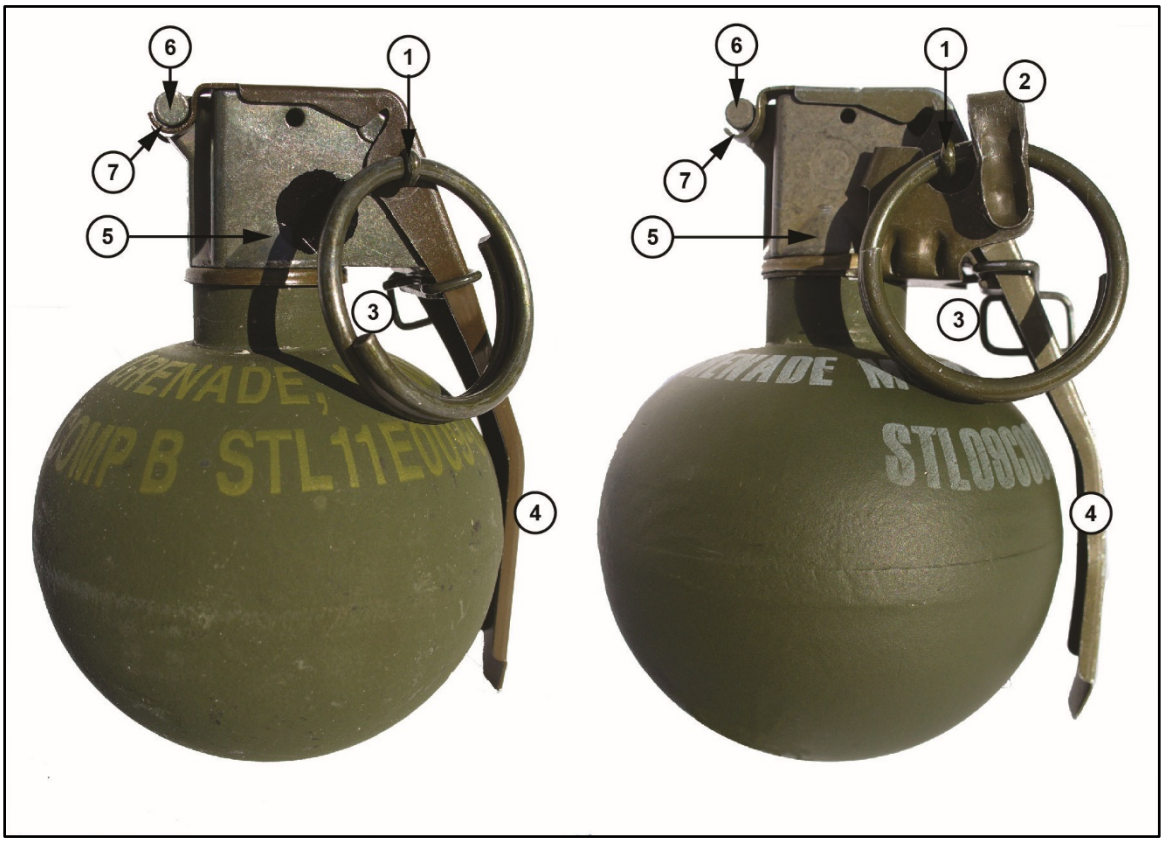

Figure B-3. Hand grenade initial inspection

BEFORE STORING

B-7. Before securing the hand grenades in ammunition pouches, personnel should take the following safety precautions:

- Inspect grenades to ensure all safety devices are present (see figure B-3):
  - Safety pin with pull ring (see figure B-3 [1]).
  - Confidence clip (if present) (see figure B-3 [2]).
  - Safety clip (see figure B-3 [3]).
  - Safety lever (see figure B-3 [4]).
  - Fuze lug (see figure B-3 [6]).
  - Safety lever fuze lug ears (see figure B-3 [7]).
- Ensure all the safety devices are intact, seated, and serviceable.
- Check the grenade fuze for tightness. Fuzes must tightly fit within the grenade body (see figure B-3 [5]).
- Ensure the lever is not bent or broken (see figure B-3 [4]).
- Check the body for rust or dirt.

Inspection Points

B-8. The following inspections points must be checked:

- Pull ring and safety pin (pull pin) assembly.
- Confidence clip (if present).
- Safety clip.
- Safety lever.
- Fuze.
- Fuze lug.
- Safety-lever fuze lug ears.

Safety Clip

Note. It is possible to remove and reattach a safety clip to a hand grenade if the safety pin is still in place.

B-9. Hand grenades equipped with a safety clip, which prevents the fuze safety lever from springing loose, may come loose during shipping or when stowing or removing from the grenade carrying pouch. When installed correctly, the safety clip secures the grenade safety lever if the safety pin assembly is accidentally removed.

Note. Not all hand grenades have safety clips. Canister-shaped hand grenades (for example, the M18 colored smoke grenade, M83 white smoke grenade, M106 SOD-Vr, AN-M14 incendiary grenade, M7A2 CS), and special-purpose hand grenades are not fitted with a safety clip. See TM 9-1330-200-12 and TM 43-0001-29 for more information about the types of grenades that require and do not require a safety clip.

B-10. Upon the removal of the hand grenades from their shipping canister, personnel must ensure the safety clip is present or install a safety clip, if required. The safety clip is adaptable to the M67 grenade, the M111 grenade, and the M228 TPF.

Note. It is possible to procure safety clips for some types of grenades through Class V ammunition supply channels (NSN 1330-00-183-5996).

B-11. To install a safety clip—

Note. The M69 practice grenade represented in figure B-4 is an example on how to properly install and reinstall the safety clip.

- Hold the fuzed grenade in the palm of your hand with the pull ring up.
- Working from the pull-ring side of the grenade, below the pull ring and confidence clip (if present), insert the small loop of the safety clip onto the safety clip slot, and across the safety lever until it snaps into place.
- Press the clip across the safety lever until the closed end of the clip touches the safety lever and snaps securely into place around it.

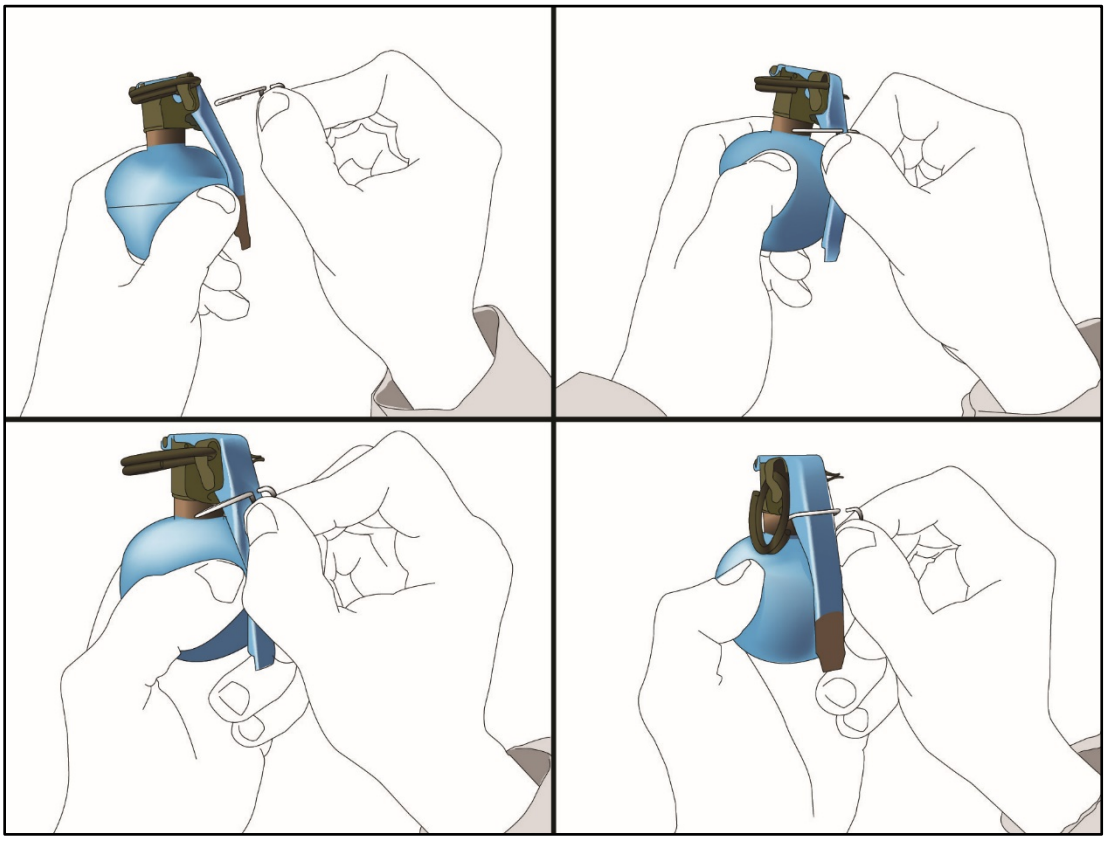

Figure B-4. Safety clip installation

DAILY CHECKS

B-12. Personnel should check hand grenades daily. Daily checks are important to ensure the equipment is serviceable before use and should be incorporated into precombat checks. To perform daily checks, see figure B-5.

Number	*DAILY INSPECTION CHECKS*
1	Ensure the pull ring with safety clip is present, fully seated, and seated into the confidence clip, if present.
2	Ensure the far side of safety pin (split end) is spread approximately 40 degrees or in a diamond-shaped configuration to prevent accidental removal. Never attempt to reshape a safety pin; report the deficiency to your NCOIC.
3	Ensure the safety clip is present and properly secured to the safety lever.
4	Check the grenade fuze assembly for tightness.
5	Ensure that the safety lever is not broken.
Legend: NCOIC – noncommissioned officer in charge	

Figure B-5. Daily inspection checks

WARNING

Never remove the fuze from a live grenade. If the grenade safety lever is broken, DO NOT use the grenade.

STORAGE

B-13. Personnel should carry hand grenades in designed grenade pouches and according to unit SOP. When storing grenades, personnel should adhere to the following guidelines:

- Ensure the carrying pouch fully contains the grenade and the pocket flap is fully secured
- Carry hand grenades using the proper procedures.

DANGER

DO NOT put adhesive tape around a grenade fuze, the pull ring, or safety lever. Accidents occurred and Soldiers were injured or killed when attempting to remove adhesive tape from modified grenades.

WARNING

DO NOT apply tape or make unauthorized modification to any type of hand grenade safety pins or clips, safety lever, fuze, or body. The safety pin can be extracted when removing tape; pins can be broken and lead to premature activation and detonation of the grenade during unauthorized modifications or manipulation of safety devices.

WARNING

Never carry the grenades suspended by the safety pull ring or safety lever.

- DO NOT tape hand grenades to Soldier gear.
- Never make unauthorized modifications to hand grenades.

WARNING

To keep grenades safe in storage, DO NOT bend, tamper, modify, or otherwise alter a hand grenade safety pin or safety lever.

- During air operations in wartime conditions, Soldiers must be prepared to engage the enemy as soon as they land; therefore, Soldiers must carry their grenades in the designated grenade pouch and stowed according to unit SOP.

CAUTION

During training missions, especially airborne operations, DO NOT carry hand grenades in ammunition pouches. Carry the grenades in the main body of the rucksack instead.

HANDHELD SIGNALS INITIAL INSPECTION

B-14. Soldiers should perform three types of inspection to ensure the serviceability of the handheld signals. These types of checks include—

- Initial inspection.
  - Wooden and M548 metal shipping containers.
  - Handheld steel container and plastic sealed container.
  - Handheld signal body.
- Before storing.
- Daily checks.

WARNING

Inspect handheld communication signals before use and properly secure them to avoid serious injury.

Note. See TM 9-1370-206-10 and SB 742-1370-94-700 for more information about handheld communication signal inspection.

SHIPPING CONTAINERS

B-15. When in bulk, communication signals come secured in shipping containers (see figures B-6 and B-7, page B-10 and B-11). Personnel should inspect the shipping container upon receipt.

B-16. Shipping containers that appear damaged should not be opened; return them to the ASP or disposed of them using the methods outlined in the unit SOP. The two types of communication signal shipping container are the M548 metal container and wood ammunition box containers.

M548 Metal Container

B-17. This container contains 24 handheld signals, individually secured in plastic containers. Upon initial inspection, Soldiers should ensure that all handheld signal containers are serviceable before departing the ASP (see figure B-6).

Figure B-6. M548 metal shipping container

Wooden Ammunition Box Container

B-18. This container contains 36 handheld signals, sealed in plastic barrier bags (see figure B-7). Each barrier bag contains 18 hermetically sealed metal containers. Each sealed container contains one handheld signal.

B-19. Upon removing the sealed barrier bags from the shipping container (see figure B-7), personnel should inspect each barrier bag and identify any of the following discrepancies:

- Damage to the barrier bag.
- Broken, tampered with, or missing seals on the barrier bag.

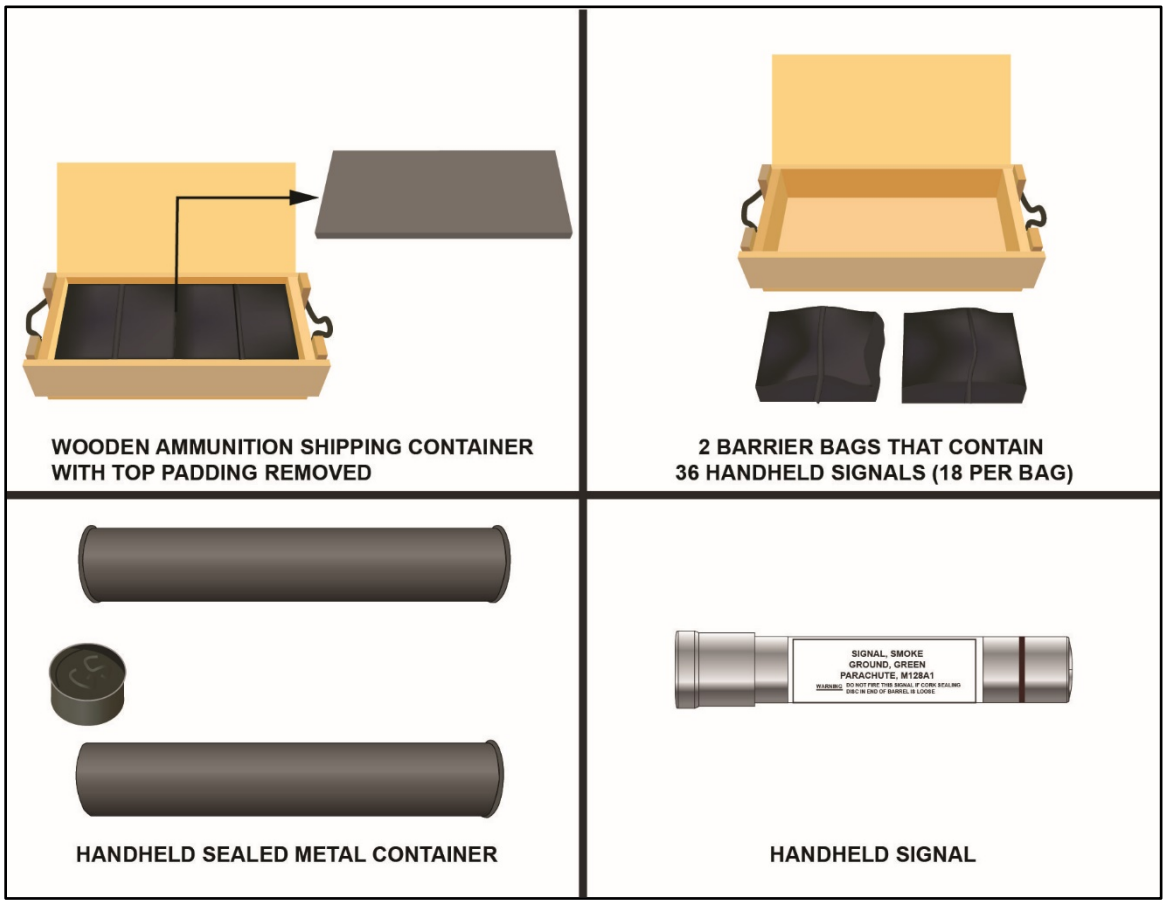

Figure B-7. Wooden shipping container

B-20. To inspect the barrier bags, Soldiers should—

- Lift box top and remove top padding.
- Observe the top position of the padding (for reclosing the box once complete).
- Remove barrier bags from shipping container and inspect each bag.

B-21. Each signal within the barrier bag comes housed in a hermetically sealed steel container (see figure B-8, page B-12) or plastic container (see figure B-9, page B-13). An individual within the chain of command may issue handheld communication signals that are still in their individual containers or unpacked. Upon removing the sealed individual containers from the barrier bag (see figure B-8, page 8-12), personnel should inspect the containers and identify any of the following discrepancies:

- Damaged container.
- Broken, missing, or tampered with seals on the container.

CAUTION

DO NOT open hermetically sealed (airtight) containers until ready for use. A signal exposed to moisture may not function.

HANDHELD CONTAINER

B-22. Personnel should then remove the handheld signal from the container. Figures B-8 and B-9 illustrate the steps for removing the cap on steel and plastic containers.

Handheld Signal Sealed Steel Container

B-23. To open the handheld signal from a hermetically sealed steel container, use the key attached to the container (see figure B-8):

- Remove the sealing strip.
- Remove the top of container.
- Remove any padding pieces from the container.
- Remove the signal.

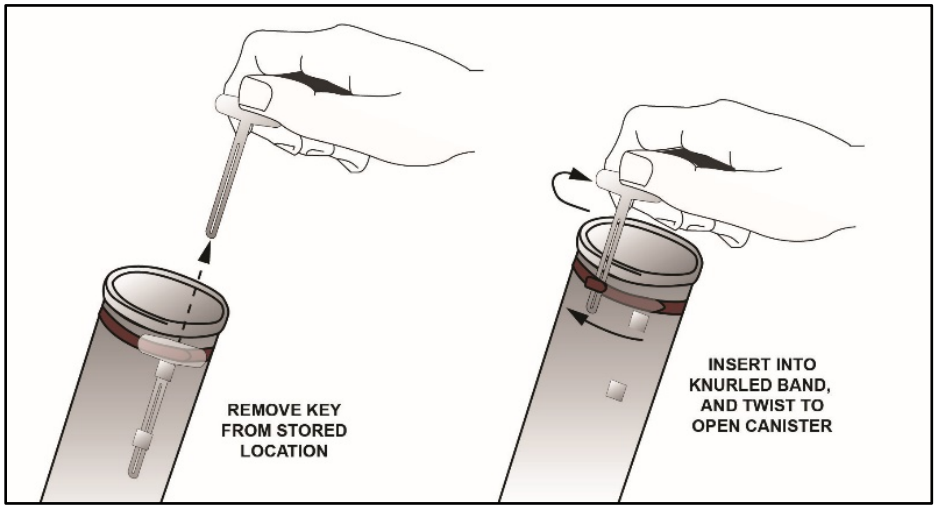

Figure B-8. Handheld signal individual sealed steel container

Handheld Signal Plastic Sealed Container

B-24. To open the handheld signal plastic sealed container (see figure B-9).

- Hold the container in one hand.
- Twist the endcap counterclockwise with the other hand.
- Remove the signal.

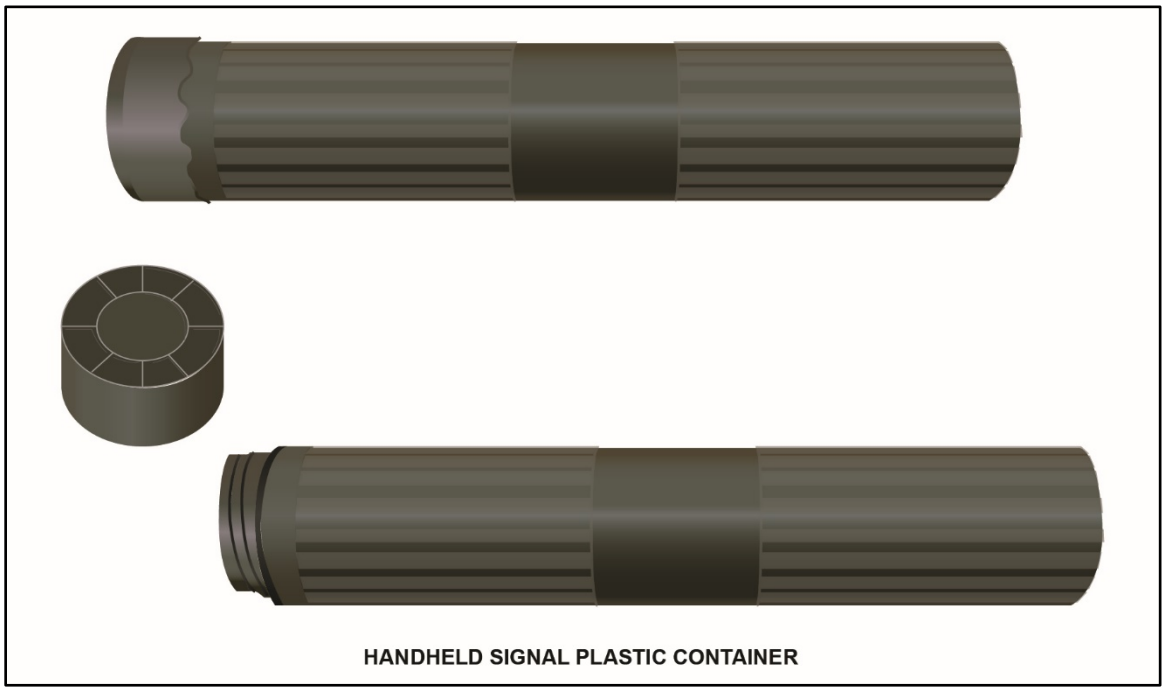

Figure B-9. Handheld signal individual container

Handheld Signal Inspection

B-25. Once the signal has been removed from the container (see figure B-9), personnel should inspect the signal and identify any of the following discrepancies:

- Corrosion on the launcher tube.
- Visible holes in the launcher tube.
- Dents in the launcher tube.
- Broken or damaged forward-end seal.
- Missing or broken firing pin.
- Dented primer or is not intact.
- Missing primer or is protruding from the launcher tube.
- Discrepancy between color-coded forward-end seal and the color listed on the data plate.

Note. If any of the discrepancies are found upon receipt of newly issued handheld signals, personnel should return the signal and individual container to the issuing person or dispose of it according to the unit SOP.

BEFORE STORING

B-26. Before securing handheld communication signals, personnel should take the following safety precautions (see figure B-10):

- Ensure the launcher tube is not bent or punctured.
- Check the launcher tube for corrosion or dirt.
- Ensure the forward-end seal is not broken or damaged.
- Ensure the firing pin is present and the primer is intact (not dented).
- Ensure the primer is not missing or protruding from the signal.
- Ensure the signal is returned to its original container, if available.

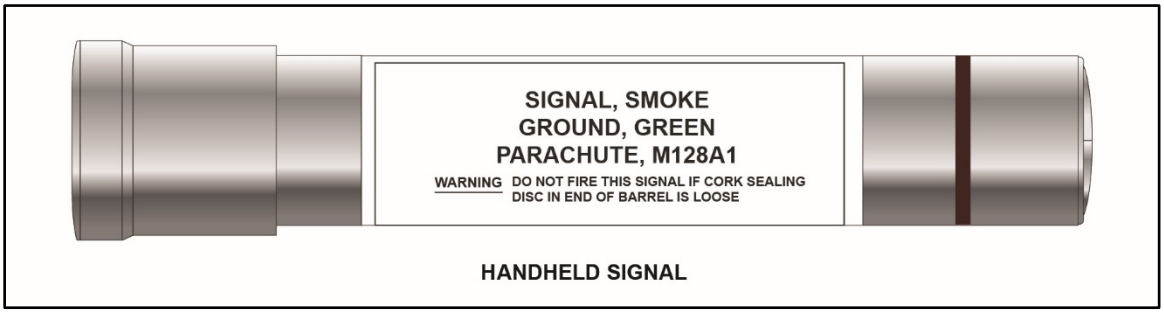
SIGNAL, SMOKE
GROUND, GREEN
PARACHUTE, M128A1
WARNING DO NOT FIRE THIS SIGNAL IF CORK SEALING DISC IN END OF BARREL IS LOOSE
HANDHELD SIGNAL

Figure B-10. Safety inspection points before storage

DAILY CHECKS

B-27. Personnel should check handheld communication signals daily to ensure that they are free of foreign material and that they remain serviceable. Any defects or unserviceable signals should be identified upon completion of daily checks.

STORAGE

B-28. Personnel should carry handheld communication signals according to the unit SOP. When carrying handheld communication signals, personnel should adhere to the following guidelines:

- Ensure communication signals are stored in a secure, dry area.
- DO NOT put adhesive tape around any portion of the handheld communication signal.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods. Open just before use.

TRIP FLARES

B-29. Soldiers should perform three types of inspections on trip flares to ensure serviceability (see figure B-11). Several portions of the trip flare must be inspected:

- Body.
- Mounting bracket.
- Other components.

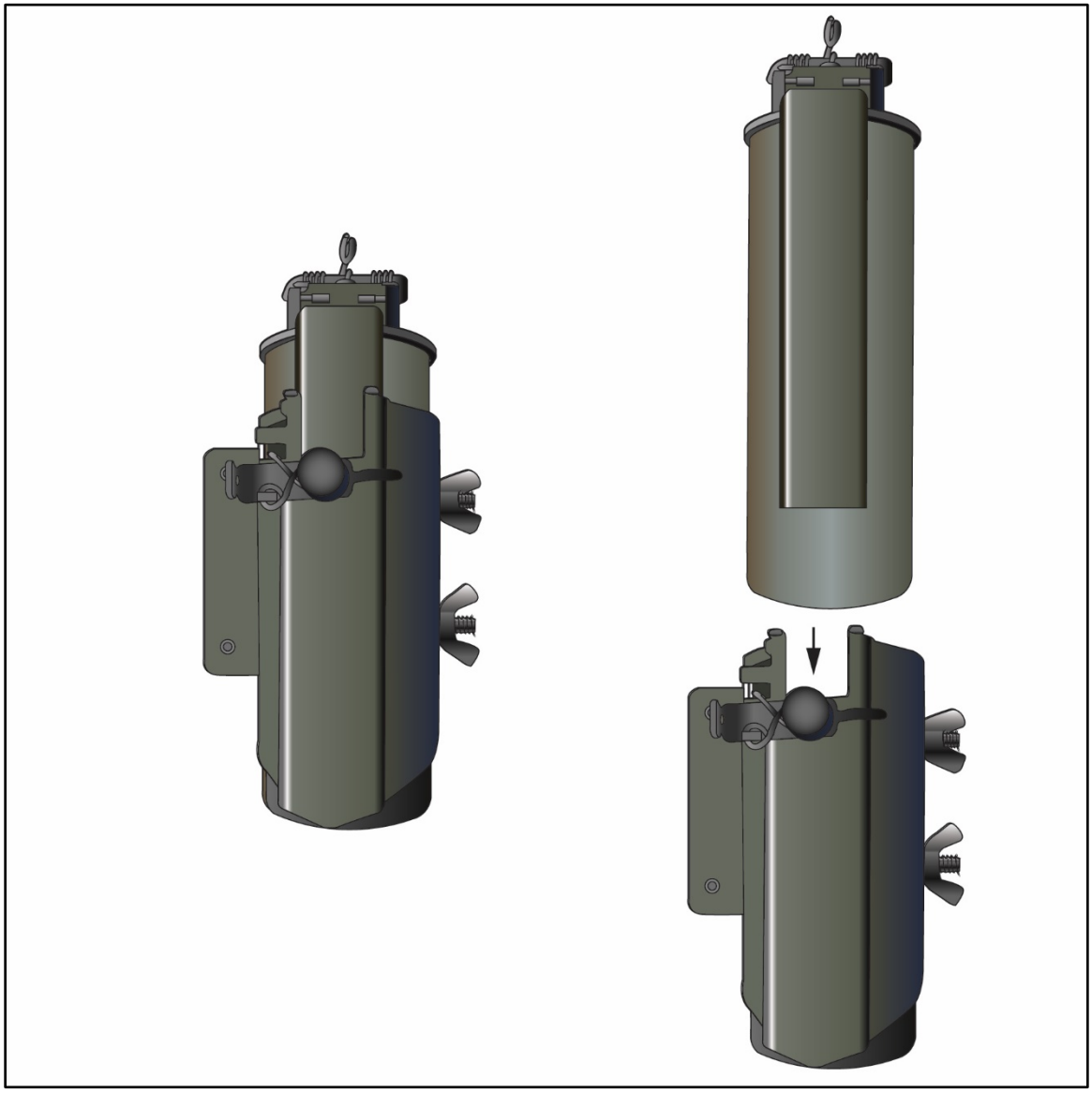

Figure B-11. M49A1 surface trip flare

BODY

B-30. Inspect the body of the trip flare in the same way as that of a hand grenade. (See paragraph B-14 for initial inspection and daily checks procedures).

MOUNTING BRACKET

B-31. Personnel should inspect the mounting bracket to ensure—

- The mounting bracket is present and firmly affixed to the flare.
- The mounting bracket shows no sign of damage.

B-32. To inspect the flare and mounting bracket for proper operation, press lever against the flare body and check for—

- Straight pull pin.
- Aligned safety clip and holes in the cover loading assembly.
- Corroded and loose cover loading assembly.
- Aligned hinge pins in the cover loading assembly.

WARNING

Turn in immediately to the supervisor if the cover assembly is corroded or loose, or if the hinge pins are misaligned.

- Deformed flare and bracket.
- Tension and position of the trigger spring. The trigger should rotate counterclockwise to the extreme position and return to the original position when released.
- Legible ammunition lot number.

Note. Flares unable to pass the above inspection should be disposed of according to the unit SOP.

OTHER COMPONENTS

B-33. The trip flare comes with a spool of trip wire and nails. Personnel should inspect these components and ensure they are present.

STORAGE

B-34. Personnel should carry trip flares according to the unit SOP. When carrying trip flares, personnel should adhere to the following guidelines:

- Ensure trip flare is in a secure, dry area.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods. Open just before use.

- DO NOT put adhesive tape around any portion of the trip flare during storage.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a trip flare. DO NOT tape any portion of the trip flare during storage.

EARLY WARNING SIMULATORS

B-35. The three types of booby trap simulators each generate a different effect upon initiation. The steps to perform a visual inspection are the same three principles of inspection covered in this appendix:

- Initial inspection (see figure B-12).
- Daily checks.
- Before storage.

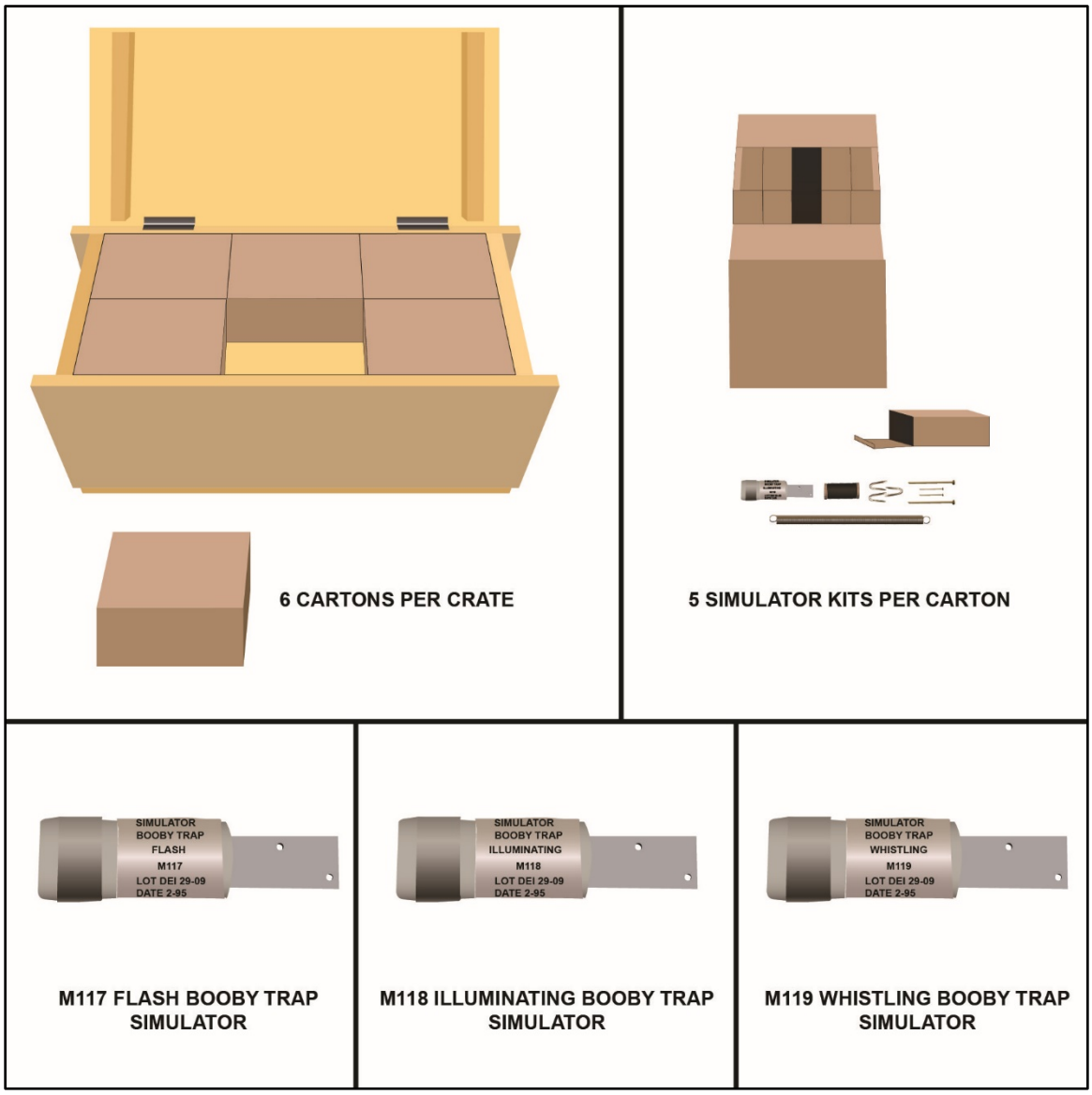

Figure B-12. Early warning simulator shipping container

INITIAL INSPECTION

CAUTION

During storage, keep boxes sealed. Duds or improper functioning could occur if exposed to moisture for long periods. Open just before use.

B-36. When in bulk, simulators arrive secured in shipping containers (see figure B-12). Personnel should inspect the shipping container upon receipt. DO NOT open damaged shipping containers; return them to the ASP or disposed of them using the methods outlined in the unit SOP.

B-37. Within the shipping container are vacuumed sealed barrier bags. Upon removing the sealed barrier bags from the shipping container (see figure B-12, page B-17), personnel should inspect each barrier bag and identify any of the following discrepancies:

- Damaged barrier bag.
- Signs of tampering.

B-38. Inside the barrier bags are cardboard shipping boxes. Upon removing the cardboard shipping boxes from the sealed barrier bags (see figure B-12, page B-17), personnel should inspect each cardboard shipping box and identify any of the following discrepancies:

- Crushed or damaged cardboard shipping box.
- Signs of tampering.

B-39. Personnel should then remove the early warning simulator from the container. Once the signal has been removed from the container (see figure B-12, page B-17), personnel should inspect the signal and identify any of the following discrepancies:

- Missing components, such as—
  - Simulator assembly.
  - Spool assembly.
  - Simulator cap.
  - Extension spring.
  - Bracket.
- Damage to the simulator assembly.
- Visible holes in the body.
- Broken cap seal.
- Damaged mounting bracket.
- Damaged or missing safety clip.

Note. If any of the discrepancies are found upon receipt of newly issued early warning simulators, personnel should return the simulator and shipping container(s) to the issuing person or dispose of it according to the unit SOP.

DAILY CHECKS

B-40. Personnel should inspect early warning simulators and ensure the following safety precautions are taken:

- Ensure the body is not bent or punctured.
- Ensure the seal securing the cap is not broken.
- Ensure the safety clip is present and not damaged.
- Ensure all other kit components are present and serviceable (see figure B-13).

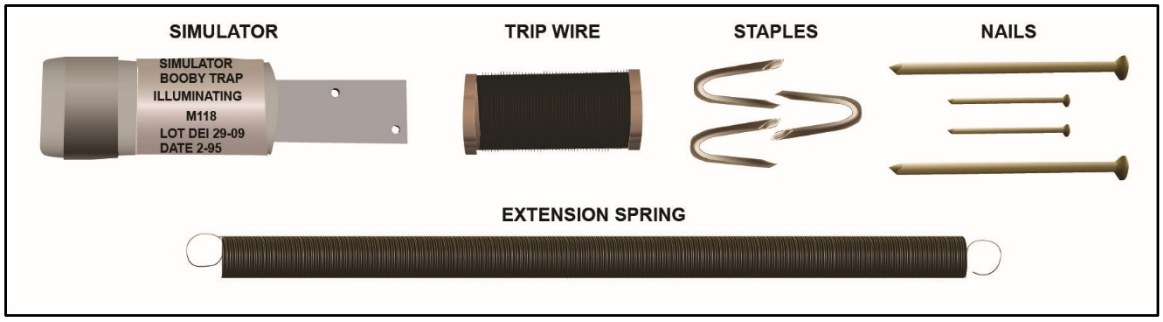

Figure B-13. Early warning components

STORAGE

B-41. Personnel should carry early warning simulators according to the unit SOP. When carrying early warning simulators, personnel should adhere to the following guidelines:

- Ensure that the early warning simulator is in a secure, dry area.
- DO NOT put adhesive tape around any portion of the early warning simulator during storage.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods. Open just before use.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a trip flare. DO NOT tape any portion of the trip flare during storage.

GROUND-BURST SIMULATOR

B-42. The ground-burst simulator is used to replicate indirect fires in a training environment upon initiation (see figure B-14). The steps to perform a visual inspection are the same three principles of inspection covered in this appendix:

- Initial inspection
- Daily checks.
- Storage.

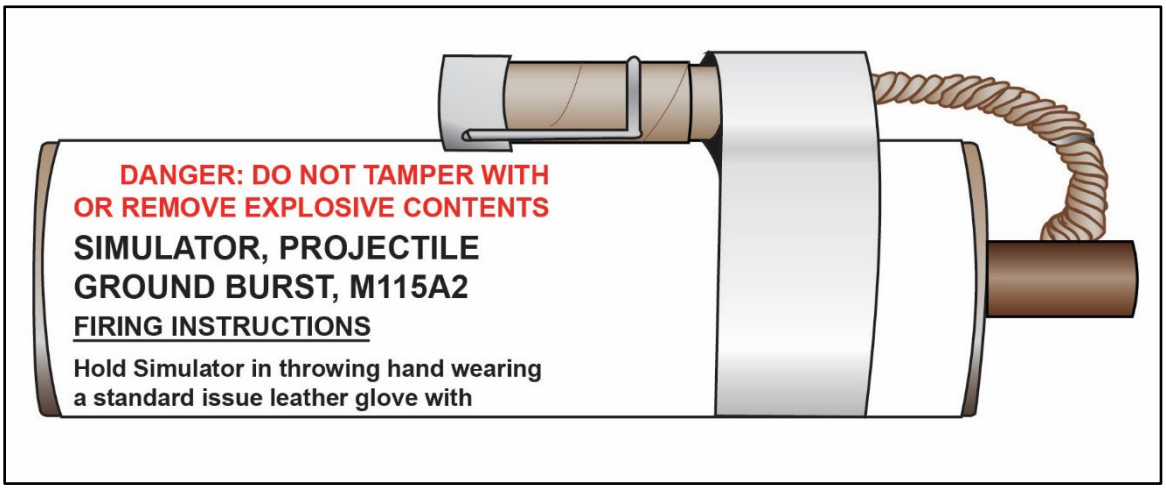
DANGER: DO NOT TAMPER WITH
OR REMOVE EXPLOSIVE CONTENTS
SIMULATOR, PROJECTILE
GROUND BURST, M115A2
FIRING INSTRUCTIONS
Hold Simulator in throwing hand wearing
a standard issue leather glove with

Figure B-14. Ground-burst simulator

INSPECTION

B-43. Inspection at unit level comprises a visual check of packaging materials. DO NOT open any moisture-proof container or barrier bag because the item must be protected from moisture until just before use.

Severe packaging defects that fail to protect packaging contents can affect proper munition serviceability and functionality. The most encountered packaging defects are listed below:

- Damaged, weathered, or rotted outer containers (boxes).
- Damaged inner container that prevents content removal.
- Improperly secured container cap or closure.
- Wet (except metal), rusted, moldy, or mildewed inner containers.
- Loose, missing, broken, or ineffective hardware or banding.
- Missing or broken handle or cleat.
- Loose contents that may damage item(s) during handling.

DAILY CHECKS

B-44. Personnel should inspect ground-burst simulators and ensure the following safety precautions are taken:

- Ensure the body is not bent or punctured.
- Ensure the string securing the cap is not broken.
- Ensure the safety clip is present and not damaged.

STORAGE

B-45. Take the following precautions when storing M115A2 ground-burst simulators—

- Select level, well-drained sites free from readily combustible and/or flammable materials.
- Provide nonflammable or fire-resistant overhead covers (for example, tarpaulin) for all items.
- Maintain overhead space of approximately 18 inches (46 centimeters) between cover and items.
- Keep cover at least 6 inches (15.5 centimeters) from pile on the ends and at sides to permit circulation of air.
- Temporarily store unserviceable items in a separate area.

HAND GRENADE SIMULATOR

B-46. The hand grenade simulator is used to generate effects in a training environment upon initiation (see figure B-15). The steps to perform a visual inspection are the same three principles of inspection covered in this appendix:

- Initial inspection
- Daily checks.
- Storage.

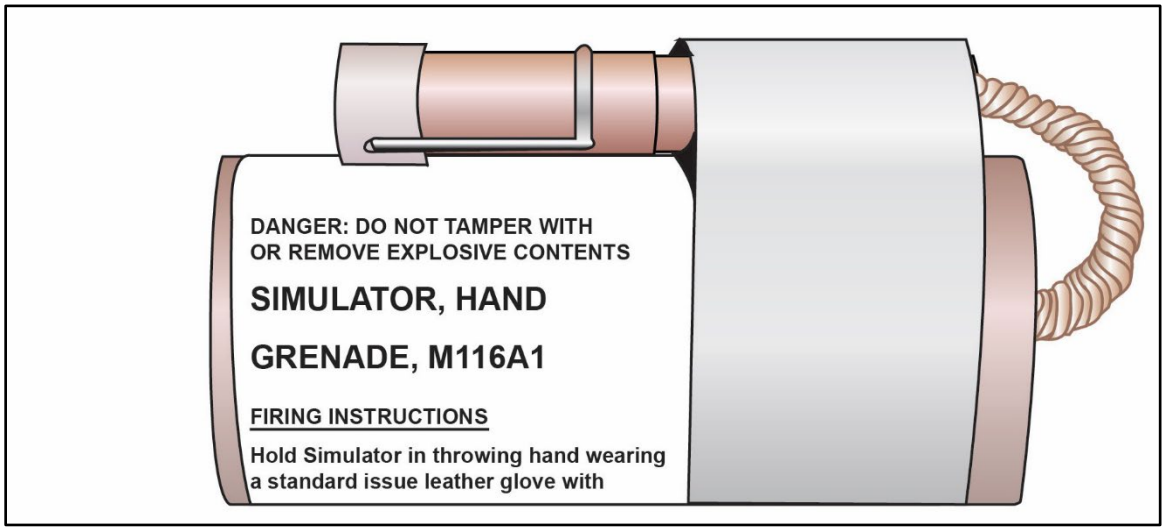

Figure B-15. Hand grenade simulator

INITIAL INSPECTION

B-47. Inspection at unit level comprises a visual check of packaging materials. DO NOT open any moisture-proof container or barrier bag because the item must be protected from moisture until just before use.

B-48. Severe packaging defects that fail to protect packaging contents can affect proper munition serviceability and functionality. The most encountered packaging defects are listed below:

- Damaged, weathered, or rotted outer containers (boxes).
- Damaged inner container that prevents content removal.
- Improperly secured container cap or closure.
- Wet (except metal), rusted, moldy, or mildewed inner containers.
- Loose, missing, broken, or ineffective hardware or banding.
- Missing or broken handle or cleat.
- Loose contents that may damage item(s) during handling

DAILY CHECKS

B-49. Personnel should inspect hand grenade simulators and ensure the following safety precautions are taken:

- Ensure the body is not bent or punctured.
- Ensure the string securing the cap is not broken.
- Ensure the safety clip is present and not damaged.

STORAGE

B-50. Take the following precautions when storing M116A1 hand grenade simulators—

- Select level, well-drained sites free from readily combustible and/or flammable materials.
- Provide nonflammable or fire-resistant overhead covers (for example, tarpaulin) for all items.
- Maintain overhead space of approximately 18 inches (46 centimeters) between cover and items.
- Keep cover at least 6 inches (15.5 centimeters) from pile on the ends and at sides to permit circulation of air.
- Temporarily store unserviceable items in a separate area.

Appendix C
Drills

Appendix C describes the various drills and purpose for hand grenades and pyrotechnics. Standardized drill structure for all devices reinforces the most common actions all Soldiers must execute with their equipment during training and combat.

Soldiers use the drills in this appendix during individual, collective, concurrent training, and deployments. These drills build and maintain skills Soldiers need to achieve proficiency and mastery of the device.

BUILDING CONFIDENCE

C-1. Each drill develops Soldiers' confidence with their equipment and actions during training and combat operations. Through repetition, Soldiers reinforce the drills, which then become second nature to them, and learn to use the equipment without any hesitation during normal and unusual conditions.

C-2. The drills use the following principles to build the Soldier's proficiency:

- Mindset. Ensures Soldiers can perform tasks quickly and effectively under stress.
- Efficiency. Ensure the drills require the least amount of movement or steps to complete correctly; make every step count.
- Individual tactics. Ensure the drills link directly to employment in combat.
- Flexibility. Provide drills that are not rigid in execution. Units may alter the procedural steps depending on their equipment, configuration, or tactical need.

MINDSET

C-3. Continuous combat is inherently stressful. Combat exhausts Soldiers and causes physiological changes that reduce their ability to perform tasks as quickly or effectively as necessary. The Soldier's ability to function under stress is the key to winning battles. Without the Soldier, weapons and tactics are useless. Individual and unit military effectiveness depends on the Soldier's ability to think clearly, accurately, and quickly, all with initiative, motivation, physical strength, and endurance.

C-4. The impact of physiological changes stemming from combat-related stress escalates or de-escalates based on the degree of stimulation Soldiers experience. Physiological changes due to stress causes Soldiers to view events in their ever-changing operational area at different levels of awareness.

Note. Soldiers can counter stress using the principles associated with Soldier resilience and performance enhancement. The Comprehensive Soldier and Family Fitness (known as the CSF2) program helps to increase a Soldier's ability and willingness to perform an assigned task or mission and to enhance their performance by assessing and training mental resilience, physical resilience, and performance enhancement techniques and skills. The initiative introduces many resources to train Soldiers on skills to counter stress. (For more information about CSF2, refer to the CSF2 website.)

EFFICIENCY

C-5. Efficiency is as an action performed within the task or movement that is designed to achieve the desired outcome. Efficient movements are naturally faster than movements that contain excessive or wasteful actions. By reducing the amount of mental and physical effort, the movement becomes repeatable and the effect becomes predictable. Thus, the Soldier can focus on tactics while still producing accurate and precise fires.

INDIVIDUAL TACTICS

C-6. Individual tactics are actions independent of unit SOPs or situations that maximize the Soldier's chance of survival and victory in a small-arms, direct-fire battle. Examples of individual tactics include using cover and standoff or the manipulation of time and space between Soldiers and their enemy.

FLEXIBILITY

C-7. The techniques presented in this appendix are not prescriptive, as Soldiers can use multiple techniques to achieve the same goal. In fact, there is no singular one-size-fits-all solution to hand grenade and pyrotechnics signal device employment; different types of enemies and scenarios require Soldiers to use different techniques. However, the techniques must be efficient and proven for conducting various hand grenades engagements during close combat operation to kill, destroy, and repel threats, while maintaining the freedom of movement to employ pyrotechnic signals to obscure the tactical small unit and mark targets for friendly ground and air supporting units.

C-8. Any other techniques selected should meet the following criteria:

- Reliable under conditions of stress.
- Repeatable under conditions of stress.
- Efficiency in motion.
- Develop natural responses through repetition.

RELIABLE UNDER CONDITIONS OF STRESS

C-9. Use techniques designed for reliability when it counts—during combat. The technique should produce the intended results without fail, under any conditions and while wearing mission-essential equipment. Soldiers should test techniques under stress conditions that are as high stress as training allows.

REPEATABLE UNDER CONDITIONS OF STRESS

C-10. As combat is a stressor, a Soldier's body responds to combat stress much as it does to any other stressful stimulus; physiological changes begin to occur, igniting a variable scale of controllable and uncontrollable responses based on the degree of stimulation. Techniques should support or exploit the body's natural reaction to life-threatening stress.

EFFICIENCY IN MOTION

C-11. Use techniques designed to create the greatest degree of efficiency of motion. The technique should contain only necessary movement. Excessive or unnecessary movement in a fighting technique costs time to execute.

DEVELOP NATURAL RESPONSES THROUGH REPETITION

C-12. Select techniques designed to build reflexive reactions that a Soldier applies in response to a set of conditions when practiced correctly and in sufficient volume. Soldiers create the muscle memory necessary to serve them under conditions of dire stress only with correct practice. The goal is to create automaticity, which is the ability to perform an action without thinking through the steps associated with the action.

BUILDING MASTERY

C-13. Drills integrate certain tasks to build the skills necessary to master functional elements of the process. The drills' designs specifically capture the routine, critical tasks or actions Soldiers must perform fluently and are second nature to them to achieve a high level of proficiency.

C-14. Soldiers practice ten primary drills to demonstrate mastery of skills:

- Drill A: Device Inspection.
- Drill B: Stow.
- Drill C: Arm.
- Drill D: Fight Down.
- Drill E: Fight Up.
- Drill F: Go-to-Prone.
- Drill G: Throwing Positions.
- Drill H: Throwing Methods.
- Drill I: Throwing Commands.
- Drill J: React to Drop or Thrown Grenade.

DRILL A: DEVICE INSPECTION

C-15. A hand grenade inspection includes, at a minimum, the following verifications:

- Pull ring and safety pin (pull pin) assembly.
- Confidence clip (if present).
- Safety clip.
- Safety lever.
- Fuze.
- Fuze lug.
- Safety-lever hinge ears.

C-16. A handheld signal inspection includes, at a minimum, the following verifications:

- Corrosion is not on the launcher tube.
- Holes are not visible in the launcher tube.
- No dents in the launcher tube.
- The forward-end is sealed.
- The firing pin is present.
- The primer is intact, not dented.
- The color-coded forward-end seal does not match the color listed on the data plate.

C-17. Soldiers initiate a device inspection when they first receive the device from the issuing point or storage facility. Visual inspection of the containers should also be conducted on initial inspection.

C-18. Units may add tasks to Drill A, as necessary. They may also direct Soldiers to execute Drill A at any time to support the unit's mission.

DRILL B: STOW

C-19. Drill B exercises the Soldier's ability to properly stow the device without the use of unauthorized equipment. When conducting this drill, Soldiers should—

- Ensure the grenade is fully inside of the carrying pouch or rucksack and secured.
- Carry the device using the proper procedures.

C-20. Soldiers must not—

- Tape the device in any way.
- Carry the device suspended by the safety pull ring or safety lever.
- Make unauthorized modifications to the device.

C-21. Soldiers should carry hand grenades in designed grenade pouches and according to unit SOP. When storing grenades, Soldiers should adhere to the following guidelines:

- Ensure that the grenade is fully inside of the carrying pouch with the pocket flap fully secured (see figure B-6, page B-10).
- Soldiers will not tape, tie down, or alter grenades or pyrotechnics while securing them.

DRILL C: ARM

C-22. Drill D is predominantly an administrative arming function. Drill D allows the Soldier to develop reliable arming techniques by using the practice hand grenade during training.

DRILL D: FIGHT DOWN

C-23. The fight-down drill builds the Soldier's understanding of how to move effectively and efficiently between throwing postures. The drill starts at a standing position, and on command, the Soldier executes the next lower position or the position the leader announces. The fight-down drill exercises the following positions in sequence:

- Standing.
- Kneeling.
- Prone.
- Alternate Prone.

C-24. Each position should be executed a minimum of three times. Leaders can use Drill D in conjunction with Drill E.

C-25. Iteration 1: From the standing position, the leader announces FIGHT DOWN (Drill D); once the Soldier has completed in the down position, Fight Up (Drill E) may be initiated.

DRILL E: FIGHT UP

C-26. The fight-up drill builds the Soldier's timing and speed while moving from various positions during operations. The drill starts in the alternate prone position, and on command, the Soldier executes the next higher position, or the position announced by the leader. Each position should be executed a minimum of three times. The fight up drill exercises the following positions in sequence:

- Alternate prone.
- Prone.
- Kneeling.
- Standing.

C-27. Leaders can use Drill E, Fight Up, in conjunction with Drill F, Go-to-Prone. Leaders may increase the tempo of the drill, which increases the speed the Soldier needs to assume the next directed position. This drill should be executed a minimum of three iterations, and the leader may switch between Drills E and F at any time at varying tempos.

C-28. Iteration 1: From the standing position, Leader announces FIGHT DOWN (Drill D), once the Soldier has completed in the prone position, Fight Up (Drill E) may be initiated.

C-29. Iteration 2: From the prone position, Leader announces FIGHT UP (Drill E), once the Soldier has completed in the standing position, Go-To-Prone (Drill F) may be initiated.

DRILL F: GO-TO-PRONE

C-30. The go-to-prone drill develops Soldiers' agility when they rapidly transition from a standing to a prone firing position. Standard time should be below 2 seconds.

C-31. Leaders announce the starting position for the Soldier to assume. Once the Soldier has correctly executed the start position to standard, the leader will announce GO TO PRONE. The drill should be conducted a minimum of five times stationary and five times while walking.

C-32. Leaders should not provide preparatory commands to the drill and should direct the Soldier to go to prone when it is unexpected or at irregular intervals. Leaders may choose to include a tactical rush when executing Drill F.

C-33. Iteration 1: From the standing position, the leader announces GO-TO-PRONE (Drill F); once the Soldier has completed in the prone position, Fight Up (Drill E) may be initiated.

DRILL G: THROWING POSITIONS

C-34. The throwing positions drill builds the Soldier's understanding of how to move effectively and efficiently between all throwing positions and should be practiced and rehearsed to build proficiency. The five throwing positions are tailored for training environments and closely linked with combat operations. This drill demonstrates the Soldier's proficiency moving between—

- Standing.
- Prone-to-Standing
- Kneeling.
- Prone-to-Kneeling.
- Alternate Prone.

C-35. The leader will announce the appropriate position to initiate the drill. Each position should be executed in a random order a minimum of three times.

DRILL H: THROWING METHODS

C-36. The throwing methods drill is executed to enhance training and develop alternative means of delivery methods when training or tactical situations arise. Soldiers will conduct this drill while wearing complete load bearing equipment. This drill provides realistic repetitions from throwing grenades at all positions.

C-37. The Soldier should perform Drill H with the following throwing technics:

- Thrown (overhand in arching motion).
- Tossed (underhand motion).
- Rolled (underhand motion with the body of the grenade in contact with the ground).
- Dropped (released on or above a desired area).
- Placed (set on a desired location or area).

C-38. Leaders may include other drills while conducting Drill H to reinforce training, as necessary. At a minimum, this drill should be conducted five times per throwing method.

DRILL I: THROWING COMMANDS

C-39. Drill I is conducted to reduce confusion concerning the who, what, and how to engage a threat in the most efficient way possible. Building throwing commands allow the leader to efficiently deploy hand grenades and pyrotechnics in a fast and effective manner, without adding any unnecessary actions or wasting excessive time. At a minimum, throwing commands should contain the following:

- Alert: Informs the team, squad, or platoon of the threat (contact)
  - Who: Who will engage the target or targets (point man, call sign, and so forth)?
  - Type: What grenade or pyrotechnic to use (fragmentary, smoke, stun, signal, star cluster, and so forth).
  - Description: What target or targets are going to be engaged (enemy dismounts, light-skinned vehicle, ops, and so forth)?
  - Direction: Informs the team, squad, or platoon of the direction of the threat (cardinal direction, clock method, or location of intended target area).
- Method: How to employ hand grenade or pyrotechnic (rolled, thrown, tossed, dropped, or placed).
- Control: What are the limitations, restrictions, or authorizations to the engagement (AT MY COMMAND, HOLD, STANDBY, RELEASE, WHEN READY, or REPORT WHEN SET)?

DRILL J: REACT TO A DROPPED OR THROWN GRENADE

C-40. Drill J can be initiated at any portion of the drills or performed in any throwing position to test Soldiers' situational awareness. This drill must be practiced and rehearsed in a rapid and fluent manner to ensure Soldiers can perform this drill correctly. The steps for this drill are—

- Leader or Soldier will announce GRENADE to inform the team of the imminent danger.
- If time permits, Soldiers will immediately move outside the lethal effective casualty-producing radius or effective radius of burning, bursting, and special purpose hand grenades.
- Seek cover. If no cover is available, Soldiers will lie in the prone position with their protective helmets in the direction of the blast to protect themselves from shrapnel.

C-41. This drill should be executed as many times as necessary. Situational awareness and reaction time should be the focus of this drill to ensure the fastest execution, with the least amount of time wasted.

DRILL K: REACT TO GROUND OR OVERHEAD FLARES

C-42. Drill K is conducted for night operations to train Soldiers on how to react to enemy pyrotechnic booby traps that may give away their position or allow the enemy to detect friendly forces. Soldier should conduct this drill using their assigned NVG during night or limited visibility hours. Drill K tests the Soldiers' reaction time and cohesion among their squad, section, or platoon. If available, leaders can set ground flares and use handheld signal flares to replicate the effects. (Steps for Drill K are found in STP 21-1-SMCT, under task number 071-326-0511 [React to Flares]).

C-43. The following are reaction steps for ground flares:

- Respond to ground flare by moving out of the illuminated area.
- Reorient alone or as a group according to SOP or as instructed.
- Continue mission.

C-44. The reaction steps for overhead flare with a warning, such as the sound of rising flares are—

- Soldiers assume the prone position, behind concealment when available, before the glare bursts.
- Protect night vision by closing the dominate eye behind the optic and observing with the other.
- Switch back to night vision protected eye and reorient or rejoin the group when the flare burns out.
- Continue mission.

C-45. The reaction steps for overhead flares without warning are the same steps as reaction to overhead flares with warning.

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Appendix D
Training

Appendix D outlines the training program for hand grenades and unit sustainment training. The training program progresses from fundamentals to advanced training, culminating with the integration of hand grenades and pyrotechnics into situational and field training exercises. The training strategy includes initial training, preliminary training, drills, sustainment training, concurrent training, hand grenade qualification course, and live-fire grenade qualification.

TRAINING STRATEGY

D-1. The hand grenade-training program produces Soldiers who are proficient in using hand grenades and pyrotechnic signals for any tactical situation. The training program's primary focus is to make Soldiers aware of the types of hand grenades and pyrotechnic signals available, what their purposes are, their capabilities, and target applications.

D-2. Units are responsible for mitigating risks by conducting preliminary training and instructions before the certification. Throughout this training, incorporate safe handling and employment practices in instructions and task execution to reduce injuries.

D-3. The training strategy will enhance the Soldiers capability, and progress to advanced hand techniques to tailor the operational environment. All unit-led training must first consist of basic knowledge and proper techniques before advancing training.

OBJECTIVES

D-4. The hand grenade training program progresses using the crawl-walk-run methodology. The program advances from fundamental to advanced training, culminating with the integration of hand grenades into situational and field training exercises.

D-5. Once Soldiers achieve proficiency, implement a sustainment program to maintain the high proficiency level. The progressive training outline can use or modify, as needed, instructions on—

- Safely inspecting and maintaining hand grenades and pyrotechnic signals.
- Visually identifying hand grenades and pyrotechnic signals and classifying by their purposes and capabilities.
- Instruction and practical exercises on fundamentals of—
- Hand grenade gripping/preparing procedures, throwing techniques, and throwing positions.
- Pyrotechnic signaling procedures and employing techniques.
- Practical exercises emphasizing—
- Distance and accuracy of hand grenades using targets of different types at various ranges.
- Smoke and incendiary grenades placement, early warning devices and communication signal launching procedures, and ground-burst simulators use.
- Negotiation of training courses that integrate hand grenades and pyrotechnic signals into buddy-team movement techniques and multiple target engagements at various ranges.

INITIAL AND SUSTAINMENT TRAINING

D-6. The training strategy for hand grenades and pyrotechnics begin with initial entry training (known as IET) conducted in basic training and continues at the unit. It is the home station unit's responsibility to sustain training and develop their subordinates on hand grenade and pyrotechnic training. (See figure D-1 for more information on the IET hand grenade training strategy.)

Initial Training

D-7. In IET, Soldiers learn how to inspect and maintain hand grenades. The training received includes proper preparing and gripping techniques for throwing the grenades from three positions—standing, kneeling, and alternate prone. Instruction also covers the M67 and M69 hand grenades, and Soldiers receive a demonstration of the AN-M14 TH3 incendiary hand grenade and M18 and M83 "burning-type" smoke grenades, and M106 SOD-Vr "bursting" quick smoke hand grenade. Then, Soldiers demonstrate skill in preparing and throwing practice grenades. Once Soldiers demonstrate proficiency, they progress to throwing live hand grenades.

D-8. IET training culminates in the Soldier's proficiency assessment conducted on the hand-grenade qualification course (consisting of seven stations). During this training, Soldiers master the art of using cover and concealment to assault enemy soldiers in the open, in trenches, in fighting positions, in bunkers, and against enemy vehicles.

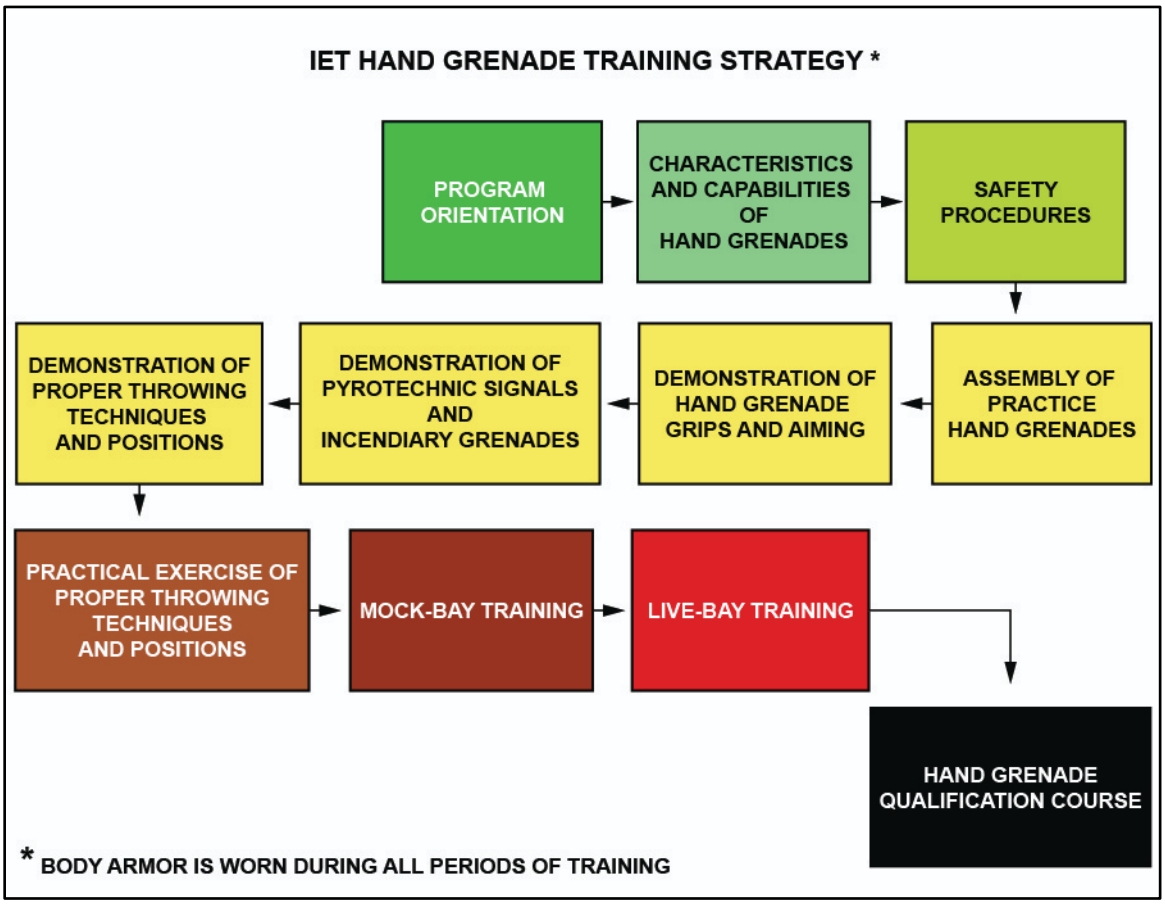
IET HAND GRENADE TRAINING STRATEGY *
PROGRAM ORIENTATION
CHARACTERISTICS AND CAPABILITIES OF HAND GRENADES
SAFETY PROCEDURES
ASSEMBLY OF PRACTICE HAND GRENADES
DEMONSTRATION OF HAND GRENADE GRIPS AND AIMING
DEMONSTRATION OF PYROTECHNIC SIGNALS AND INCENDIARY GRENADES
DEMONSTRATION OF PROPER THROWING TECHNIQUES AND POSITIONS
PRACTICAL EXERCISE OF PROPER THROWING TECHNIQUES AND POSITIONS
MOCK-BAY TRAINING
LIVE-BAY TRAINING
HAND GRENADE QUALIFICATION COURSE
* BODY ARMOR IS WORN DURING ALL PERIODS OF TRAINING

Figure D-1. Initial entry training strategy for hand grenades

Sustainment Training

D-9. Training continues in active Army, National Guard, and Army Reserve units using the same basic skills taught in IET but at a higher level of skill. Units should set up a year-round program to sustain skills and have a plan for when Soldiers are at their home station and deployed.

Notes. (1) Hand grenade training is a high-risk form of individual training. Not only must units reinforce training Soldiers received during IET, they must also add training on hand grenades used at the unit level (not covered in IET). (2) Pyrotechnic signals are used throughout IET. However, IET Soldiers only view demonstrations provided by range instructors and training cadre. Unit leaders must ensure Soldiers receive training and are aware of the capabilities of pyrotechnic signals before issuing them.

D-10. To sustain the basic hand grenade skills taught in IET, units should conduct periodic preliminary instruction, followed by the hand grenade instructional and qualification course. Key elements include—

- Training the trainer.
- Refresher training of hand grenade skills using the M69 TPG and M112 TPG.
- Sustainment training using live hand grenades.
- Remedial training.

Note. Not all Soldiers are proficient in throwing grenades. A Soldier who demonstrates high-risk tendencies during practice events must be identified and receive training reinforcement before throwing live hand grenades. DO NOT allow Soldiers who continually demonstrate high-risk tendencies during reinforcement training to throw live hand grenades or use pyrotechnic signals.

D-11. Additional skills trained in the unit include—

- Hand grenades other than the M67.
- Pyrotechnic signal employment considerations.
- CBRN with hand grenades and pyrotechnic signals.
- Employment of hand grenades (exploding, bursting, and burning smoke) as a member of a fire team.

D-12. Train and integrate these skills into collective training exercises, such as platoon and squad live-fire situational training exercises (known as STXs). This will provide the Soldier with various experience using hand grenades and pyrotechnics in a variety of different situations.

CAUTION

Fragmentation, blast-overpressure, and nonlethal stun (flashbang) grenade training is considered high-risk training. These grenades should be thrown on designated hand grenade ranges only. Units must use the M69 TPG with or without an M228 TPF to simulate employment of the fragmentation grenade, and the M112 POHG with M228 TPF with confidence clip to simulate employment of the blast-overpressure grenade. Units will train with the nonlethal M102 practice stun hand grenade with M240 detonating fuze to simulate the employment of the nonlethal stun grenade for reinforcement training and collective training scenarios.

TRAINING PROGRAM

D-13. The training listed in this chapter, except for the standard Army hand grenade qualification course, is a model to assist units in meeting their training objectives. This training can be modified to support the unit mission-essential task list (METL), the terrain, and the commander's intent.

MISSION-ESSENTIAL TASKS

D-14. Hand grenade proficiency is critical to Soldiering and is required for any unit deployed to a wartime theater. All commanders should develop a METL and organize a training program that devotes adequate time to hand grenade and pyrotechnic signals. Consider the unit's combat mission when establishing training priorities.

D-15. This not only applies to the tasks selected for the unit's METL, but also to the conditions under which the tasks are to be performed, especially in an urban environment, where the effects of blast, burning, and/or vapor hazards, and wind cause adverse effects.

TRAINING ASSESSMENT

D-16. To conduct an effective hand grenade program, the unit commander must determine the current level of proficiency of all assigned personnel. Constant evaluation provides commanders understanding of where training emphasis is necessary. Review results to determine any areas that need strengthening, along with any individuals who require special attention. Based on this evaluation, develop hand grenade and pyrotechnic signal training programs. Commanders continually assess the program and modify it, as required. To develop a training plan and assess the training program, commanders should use the following tools:

- Direct observation of training.
- Spot checks.
- Review of past training.

D-17. Based on the commander's evaluation, identify goals, missions, and semiannual or annual training events. Training programs must be continuous, and to sustain an effective program, resources are required. While the unit may only qualify its Soldiers annually, test results show that sustainment training is required at least semiannually to maintain Soldier skills.

Direct Observation of Training

D-18. Observing and accurately recording Soldier performance reveal the status of qualification results and each Soldier's ability to identify the threat and successfully engage a target with the correct hand grenade. Observations and documentation also allow the Commanders can use spot checks or review past training to identify Soldiers who need special assistance to reach required standards and those who exceed these standards.

Note. Soldiers should also receive certification(s) on pyrotechnic signals.

D-19. Spot checks of individual training performance, such as Soldier interviews and evaluations, provide commanders with valuable information about Soldier proficiency and knowledge of the training tasks. Commanders review past training to gain valuable information to develop a training plan. The assessment should include the training program task and the frequency and results of training.

Commander's Evaluation Guide

D-20. The commander's evaluation guide contains three sections. They are as follows:

- Commander's priorities and intent.
- Soldier assessment.
- Trainer assessment.

D-21. The following paragraph is an example of a commander's evaluation guide. Commanders can use this guide not only to assess their unit's training proficiency but also to assess unit leaders and their ability to implement a training program. Additionally, they can use it to develop noncommissioned officers (NCOs) into subject matter experts.

Commander's Priorities And Intent

D-22. When considering their priorities and intent, commanders answer the following questions:

- Have you clearly stated the priority of hand grenades and pyrotechnic signals in your unit? What is it? Do the staff and subordinates support this priority? Is it based on your METL and an understanding of ADRP 1-03 and ADP 7-0?
- Have you clearly stated the intent of hand grenade and pyrotechnic signal training and qualification? Are leaders evaluating Soldier performance based on accurately recorded data and results?
- Have you clearly stated that hand grenade training and qualification is one of the commander's opportunities to assess several skills relating to team and squad readiness?
- What training and qualification course will be used to evaluate your unit's readiness?
- How will it be conducted? Will training follow the prescribed procedures?
- Who will collect the data?
- Have you clearly stated the purpose and intent of preliminary instruction?
- What skills will preliminary instruction address?
- Will preliminary instruction be performance-oriented? Are tasks integrated?

Soldier Assessment

D-23. During Soldier assessment, commanders answer the following questions:

- Do Soldiers know how to maintain, inspect, and stow their assigned hand grenades and pyrotechnic signals according to the technical manual(s)? Do they have a manual?
- Do Soldiers conduct serviceability checks of assigned hand grenades and pyrotechnic signals before training? Did they identify and correct maintenance deficiencies?
- Do Soldiers demonstrate an understanding of the operation, functions, and capabilities of hand grenades and pyrotechnic signals?
- Do Soldiers demonstrate their knowledge of wind effects when employing smoke grenades?
- During individual and collective training, do Soldiers demonstrate their ability to manage allocated hand grenades to engage all targets? Do they throw several hand grenades at one target?
- Do Soldiers demonstrate proficiency during night operations and when using NVG?
- Do Soldiers demonstrate individual proficiency during CBRN conditions? During collective exercises?
- Do tactical exercises and unit live-fire exercises (known as LFXs) integrate hand grenade skills and pyrotechnic signals?
- Based on onsite observations and analysis of training performance, what skills or tasks show a readiness deficiency?
- What skills need training emphasis? Individual emphasis? Leader emphasis?
- What are the performance goals?

Trainer Assessment

D-24. During trainer assessment, commanders answer the following questions:

- Who has trained or will train the trainers?
- What is the subject matter expertise of the cadre?
- Are they training the critical skills?
- Have they addressed the basic skills first?
- What aids and devices are being used?

- What administrative constraints or training distracters can you overcome for the junior officer and NCO? Do the sergeants do the job with which they are charged?
- At what level are the resources necessary to train hand grenades and pyrotechnic signals (time, training aids, ammunition, and ranges) controlled?

TRAINERS

D-25. Knowledgeable cadre or trainers are the key to hand grenade training performance. All commanders must be aware of this to maintain expertise in hand grenade instruction/training.

CADRE OR TRAINERS

D-26. Cadre or trainers refer to weapons instructors or trainers who have more experience and expertise than the Soldier who is receiving the instruction. They train Soldiers to use hand grenades, and if required, pyrotechnic signals safely and effectively. The cadre or trainer maintains strict discipline during training, insists on compliance with range procedures and program objectives, and enforces safety regulations.

SELECTION

D-27. Select institutional and unit cadre or trainers from the most highly qualified Soldiers. These Soldiers must demonstrate proficiency in all aspects of hand grenade and pyrotechnic signal employment, know the importance of training, and have a competent and professional attitude. The commander must ensure that selected unit cadre or trainers can effectively train other Soldiers. Establish local cadre or trainer training courses and weapons certification programs to ensure instructor or trainer skills are developed.

DUTIES

D-28. Cadre or trainers help the Soldier master the fundamentals of hand grenade and pyrotechnic signal employment. They ensure Soldiers consistently apply what they have learned. When training a beginner, the cadre or trainer confronts problems, such as fear, nervousness, forgetfulness, failure to understand, and a lack of coordination or determination. Arrogance or carelessness can compound the problems. With all types of Soldiers, the cadre or trainer must ensure Soldiers are aware of their own errors, understand the causes, and apply remedies.

D-29. To perform these duties, cadre or trainers—

- Observe Soldier actions.
- Question the Soldier.
- Analyze Soldier actions.

Observe Soldier Actions

D-30. To pinpoint errors, the cadre or trainer observes the Soldier during drills, when preparing and throwing hand grenades and when using pyrotechnic signals. If there is no indication of probable error, they closely observe Soldier's grip, preparation (removing safety devices or placement), launching or throwing position, release, and safe covering position.

Question the Soldier

D-31. Cadre or trainers ask Soldiers to state their throwing hand in order to explain throwing procedures. This allows for the Cadre or trainer to identify where the grenade or pyrotechnic is located and observe any errors in grip, stance, or position.

Analyze Soldier Actions

D-32. Analyzing Soldier actions is an important step in detecting and correcting errors. When analyzing Soldier actions, the cadre or trainer correlates observations of the Soldier to probable errors in performance, according to the type of hand grenade used and the target. Poor performance usually stems from more than one observable error.

TRAIN THE TRAINER

D-33. Knowledgeable small-unit leaders are key to weapons training. This training circular and other training publications provides the unit commander with the required information to develop a good train-the-trainer program.

D-34. The goal of a progressive train-the-trainer program is to achieve a high state of combat readiness. Through the active and aggressive leadership of the chain of command, a perpetual base of expertise is established and maintained.

D-35. The commander should identify unit personnel who have had assignments as weapons instructors. Use these individuals to train other unit cadre by conducting preliminary instruction and LFXs for their Soldiers.

D-36. A suggested train-the-trainer program is outlined below:

- Conduct a diagnostic test to determine necessary training.
- Conduct practice/live hand grenade range operations.
- Conduct the hand-grenade qualification course.

TRAINER CERTIFICATION PROGRAM

D-37. The certification program sustains the cadre or trainers' expertise and develops methods of training. The program standardizes procedures for certifying hand grenade and pyrotechnic signal trainers. Cadre or trainers' technical expertise must be continuously refreshed, updated, and actively managed.

TRAINING BASE

D-38. The training base can expect the same personnel changes as any other organization. Soldiers assigned as cadre or trainers have varying degrees of experience and knowledge of training procedures and methods. Therefore, the trainer certification program must be an ongoing process that is tailored to address these variables. At a minimum, formal records should document program progression for each trainer. All cadre or trainers must complete the four phases of training using the progression steps and update the records on a quarterly basis.

CERTIFICATION PROGRAM OUTLINE

D-39. Before certification, all trainers must attend all phases of the train-the-trainer program in the following order:

- Phase I—Program Orientation.
- Phase II—Preliminary Hand Grenade and Pyrotechnic Signal Training.
- Phase III—Basic Hand Grenade Pyrotechnic Signal Training.
- Phase IV—Advanced Hand Grenade Pyrotechnic Signal Training.

D-40. They then conduct all phases to demonstrate their ability to train Soldiers and to diagnose and correct problems. Cadre or trainers who do not attend or pass any phase of the diagnostic examination should be assigned to subsequent training.

Phase I—Program Orientation

D-41. Program orientation should be conducted using the train-the-trainer model. During this phase, the cadre/trainer must accomplish the following tasks and be certified by the chain of command:

- Be briefed on the concept of the certification program.
- Be briefed on the unit weapons training strategy.
- Review the unit weapons training outlines.
- Review issued reference material.
- Visit training sites and firing ranges.

Phase II—Preliminary Hand Grenade and Pyrotechnic Signal Training

D-42. Phase II should be completed no more than two weeks following the conclusion of phase I. During phase II, the cadre or trainers demonstrate their ability to master hand grenade and pyrotechnic signal fundamentals, and the chain of command reviews their performance. Record and maintain the results of this review on the cadre or trainer's progression sheet according to the unit SOP.

D-43. The cadre or trainer explains—

- Characteristics.
- Capabilities.
- Safety, inspection, and maintenance procedures.
- Assembly of practice hand grenades.
- Installation of safety clips (M228 TPF or M67 fragmentation grenade).

Note. For hand grenades that come with a safety clip, the safety clip may detach during shipping and storage. See paragraphs B-9 through B-11 for information about safety clip installation.

- Demonstration of pyrotechnic signals and incendiary grenades.
- Preparation (safety devices, right- and left-hand grips).
- Throwing positions and techniques.
- Mock-bay training.
- Live-bay training.
- Hand grenade qualification course.

Phase III—Basic Hand Grenade and Pyrotechnic Signal Training

D-44. During this phase, the cadre/trainers demonstrate and reinforce lessons learned during phase II. The cadre or trainer explains—

- Coordination requirements and range duties for conducting a hand grenade training course.
- The range layout and the conduct of training.

D-45. Commanders determine when the cadre or trainer is ready to move to the next phase of certification. They only do this upon satisfaction the cadre/trainer has successfully demonstrated expertise in setting up and conducting hand grenade and pyrotechnic signal training and qualification. At the completion of phase III, the commander should schedule phase IV certification and direct the cadre or trainer to begin coordination. Record and maintain the results of this review on the cadre or trainer's progression sheet.

Note. Commanders should select a unit range-operations certified OIC and RSO to open and run the range so that they can view the cadre or trainer being certified according to DA Pam 385-63.

Phase IV—Advanced Hand Grenade and Pyrotechnic Signal Training

D-46. The final phase of the train-the-trainer program tests the cadre or trainer. During this phase, the cadre or trainer sets up a hand grenade range and hand grenade qualification course and conducts training for at least one person. If M69 hand grenades (with the M228 TPF), M67 hand grenades, and pyrotechnic signals are available, the cadre or trainer conducts a firing exercise. If training ammunition and pyrotechnic signals are unavailable, base the evaluation on the quality of training given.

TRAINING PREPARATION

D-47. Training preparation involves the following three steps:

- Conduct a training risk assessment.
- Conduct an environmental risk assessment.
- Make range coordination.

CONDUCT A TRAINING RISK ASSESSMENT

D-48. The OIC or NCOIC conducts a training risk assessment. It is vital to identify unnecessary risks by comparing potential benefit to potential loss. The collection requirements management (CRM) process allows units to identify and control hazards, conserve combat power and resources, and complete the mission. This process is cyclic and continuous; it must be integrated into all phases of operations and training.

D-49. CRM balances benefits against potential losses. It provides commander and leaders with the tools to accomplish realistic training while preserving the scarce resources of personnel, time, and equipment. When used properly, CRM is a training enabler. (For more information on CRM, refer to ATP 5-19.)

D-50. The five steps to the CRM process are—

- Identify hazards.
- Assess hazards to determine risk.
- Develop controls and make risk decisions.
- Implement controls.
- Supervise and evaluate.

Note. Risk decisions must be made at the appropriate level.

Identify Hazards

D-51. When identifying hazards, leaders should consider—

- The lethality of the hand grenades and pyrotechnic signals used.
- The area in which training is to be conducted.
- How the addition of new elements influences known hazards.
- Any environmental impact.

Assess Hazards to Determine Risk

D-52. Once identified, hazards are assessed by considering the likelihood of its occurrence and the potential severity of injury without considering any control measures. When assessing hazards, leaders should consider the Soldiers' current state of training.

Develop Controls and Make Risk Decisions

D-53. Leaders must apply the following two types of control measures to hand grenade risk assessments:

- Educational controls.
- Physical controls.

D-54. The unit commander's controls should be clear, concise, executable orders. This will ensure that all hazards may be identified and corrected at the lowest level.

Note. Most vital to developing CRM controls is mature, educated leadership.

Educational Controls

D-55. Educational controls occur when adequate training takes place. They require the largest amount of planning and training time. Leaders implement educational controls using the following two sequential steps:

- Certify supervisors and instructors.
- Execute Soldier training.

Note. Hand grenade and pyrotechnics training require extensive direct supervision, but how much supervision required decreases as the Soldier's proficiency increases.

Physical Controls

D-56. Physical controls are the measures emplaced to reduce injuries. This includes not only protective equipment but also certified personnel to supervise the training. Unrestrained physical controls are, in themselves, a hazard.

Implement Controls

D-57. When leaders implement controls, they must match the controls to the Soldier's skill level. They must also enforce every control measure as a means of validating its adequacy.

Supervise and Evaluate

D-58. This step allows leaders to eliminate unnecessary risk and ineffective controls by identifying unexpected hazards and determining if the implemented controls reduce the residual risk without interfering with the training.

CONDUCT AN ENVIRONMENTAL RISK ASSESSMENT

D-59. All leaders, trainers, and Soldiers must comply with environmental laws and regulations. Leaders must identify the environmental risks associated with training individual and collective tasks and implement environmental protection measures by integrating them into plans, orders, SOPs, training performance standards, and rehearsals.

D-60. Environmental risk management parallels safety risk management and is based on the same philosophy. Environmental risk management comprises identifying hazards before they happen and assessing hazards caused during training. (See ATP 5-19 for more information on risk management.)

Identify Hazards

D-61. Leaders should identify the potential sources for environmental degradation during the analysis of METT-TC factors. An environmental hazard is a condition with the potential for polluting air, soil, or water or destroying cultural or historical artifacts.

Assess Hazards

D-62. Leaders should analyze the potential severity of environmental degradation by using the risk assessment matrixes in ATP 5-19. The risk effect value is an indicator of the severity of environmental degradation. Leaders categorize the levels of risk to the environment resulting from the operation as extremely high, medium, or low using the assessment matrixes. (See ATP 5-19, table 1-1, risk assessment matrix.)

MAKE RANGE COORDINATION

D-63. Once the risk assessment is completed, viewed, and command-approved, then the OIC or NCOIC should check out the range and coordinate for range use. Ranges include distance and accuracy ranges, mock-bay throwing pits, and live-bay throwing pits.

Note. Ensure the range layout is consistent with requirements outlined in TC 25-8. The OIC or NCOIC should coordinate at least one day ahead of actual use to rehearse range setup and conduct.

Distance and Accuracy Ranges

D-64. A four-lane layout (see figure D-2, page D-12) is recommended. These lanes should enable Soldiers to engage—

- A fighting position at 30 meters.
- A trench target at 40 meters.
- A fortified mortar pit at 20 meters.
- Soldiers in the open at 20 meters.

Note. The four lanes may be combined if the terrain does not allow four stations.

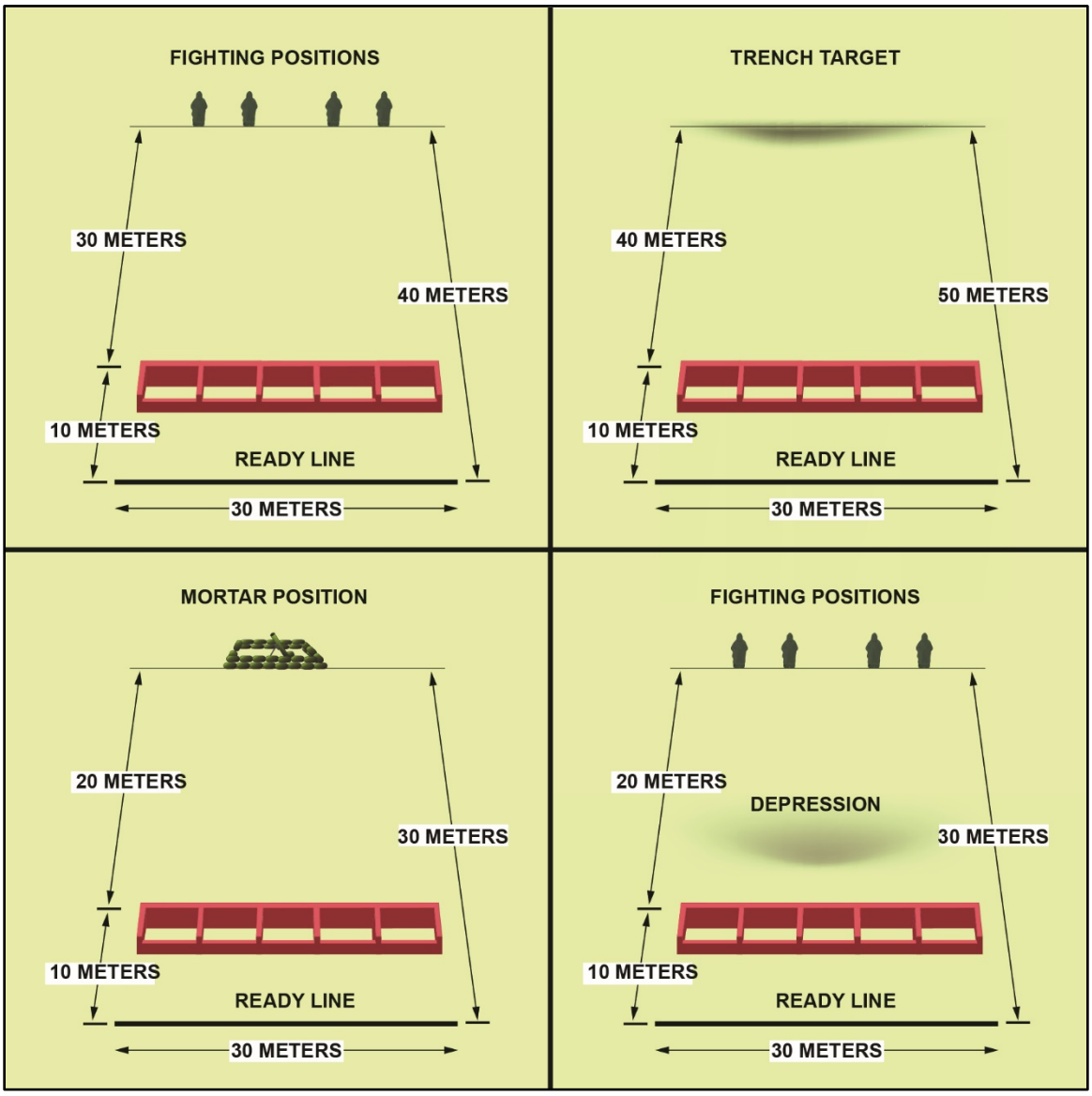

Figure D-2. Distance and accuracy layout

Mock-Bay Throwing Pits

D-65. The hand grenade mock bay must replicate the dimensions and safety areas found at live bays. At this station of hand grenade training, Soldiers learn live-bay procedures. Soldiers attending this training must identify their throwing hand and demonstrate the correct throwing procedures.

Note. Soldiers throw from the standing position during mock-bay and live-bay training.

D-66. The types of mock-bay throwing pits are as follows:

- Throwing pit and knee wall. A mock-bay training pit can consist of treated plywood (see figure D-3). Protective reinforcement materials used in a live-bay throwing pit are not necessary.
- Suspended guide wire. Placing an approximate 6-meter (20-feet) high-suspended guide wire approximately 28 meters (92 feet) in front of the mock-bay pit assists Soldiers in achieving throwing distance.
- E-type silhouettes. Placing E-type silhouettes at 40 meters from the mock-bay pit provides targets for throwing accuracy and distance.

Figure D-3. Hand grenade mock-bay layout

Live-Bay Throwing Pits

D-67. Figures D-6 through D-8 on pages D-15 and D-16 depict a suggested hand grenade live-bay design. Live-bay throwing pits should incorporate the following elements:

- Observation pits or tower.
- Throwing pit.
- Knee wall.
- Sand/sawdust pit.
- Revetments and berms.
- Separation distance.
- Observation windows.

Observation Pits or Towers

D-68. Observation pits or towers should be a sufficient height to enable range personnel to observe and control all throwing pits. Laminated 35-mm (about 1 $^{3}/_{8}$-inches) windowpanes (constructed as described below) provide the necessary degree of safety:

- 10-mm glass (outside).
- 7-mm polycarbonate resin sheet.
- 6-mm glass.
- 6-mm polycarbonate resin sheet.
- 6-mm glass.

Throwing Pit

D-69. The throwing pit provides 1.5 meters of frontal cover (approximately 59 inches). This height allows the Soldier to stand, see the target, and safely throw the hand grenade. The wall also provides cover when in a kneel position.

Knee Wall

D-70. The throwing pit should have a rear wall (knee wall) approximately 0.6-meters (24-inches) high and 0.15-meter (6-inches) thick (see figure D-4). The knee wall should extend the width of the throwing pit, connecting both ends of the enclosure. The top of the knee wall should slope inward to allow any grenade dropped on the wall to roll into the throwing pit. The knee wall should have drainpipes (no more than 2 inches in diameter) to allow throwing pit drainage. The floor of the pits should slope in the direction of the drainage pipes. Throwing pits that DO NOT have knee walls must have safety pits attached to both sides (see figure D-5).

Note. DO NOT construct grenade sumps or ditches inside the throwing pits.

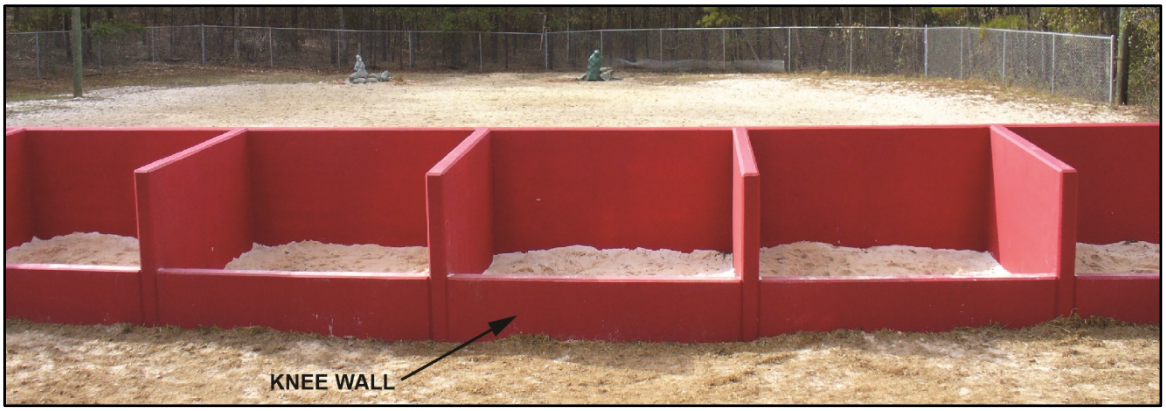

Figure D-4. Throwing pit with knee wall

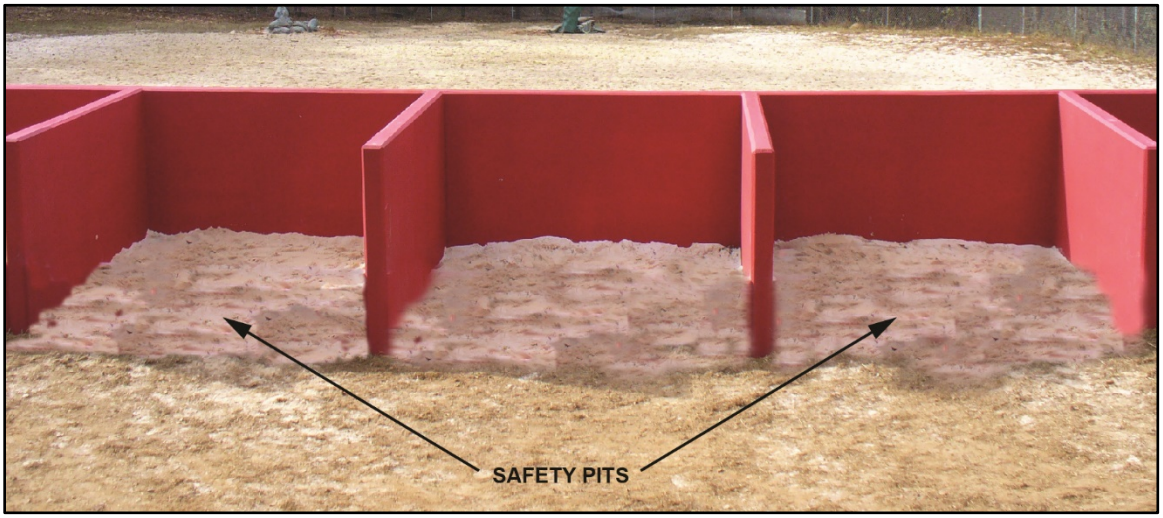

Figure D-5. Throwing pit with safety pits

Sand/Sawdust Pit

D-71. A sand/sawdust pit is placed outside of the knee wall to cushion the fall of personnel diving over the wall in the event a grenade is dropped in the throwing pit.

Revetments and Berms

D-72. Where possible, the throwing pits should be separated by earthen beams. The beams may be earthen, concrete, or timber-constructed, are typically 1.5-meters high, and extend 50-meters downrange. They must provide a minimum of 40 meters for the throwing lanes. Throwing area for the lanes is 25 meters (typical) and forms the berm center to control bunker center. This permits grenade throwing to continue from the adjacent pit when a dud grenade requires closure of a specific pit pending dud disposal.

Separation Distance

D-73. Live-bay throwing pits should have a separation distance of 25 meters between each lane (see figures D-6 through D-8, pages D-15 and D-16). This places adjacent pits outside the effective kill zone radius of 15 meters for the M67 fragmentation grenade.

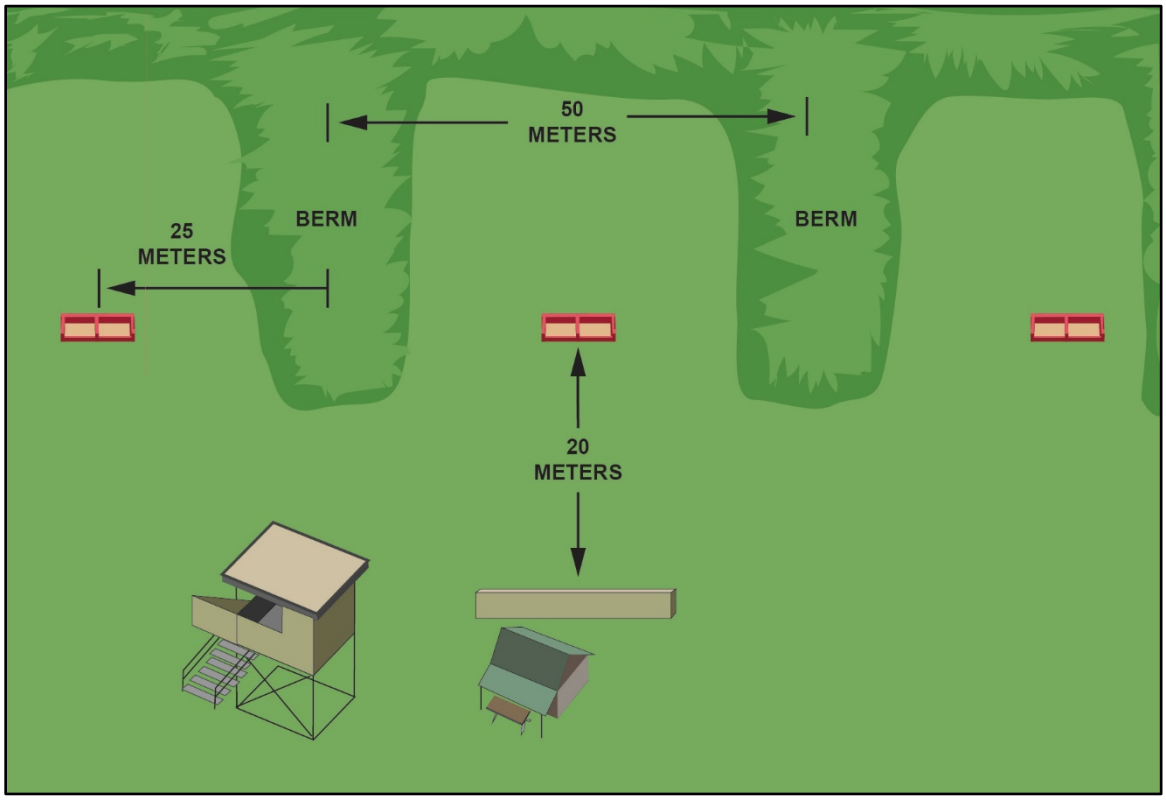

Figure D-6. Suggested live-bay layout

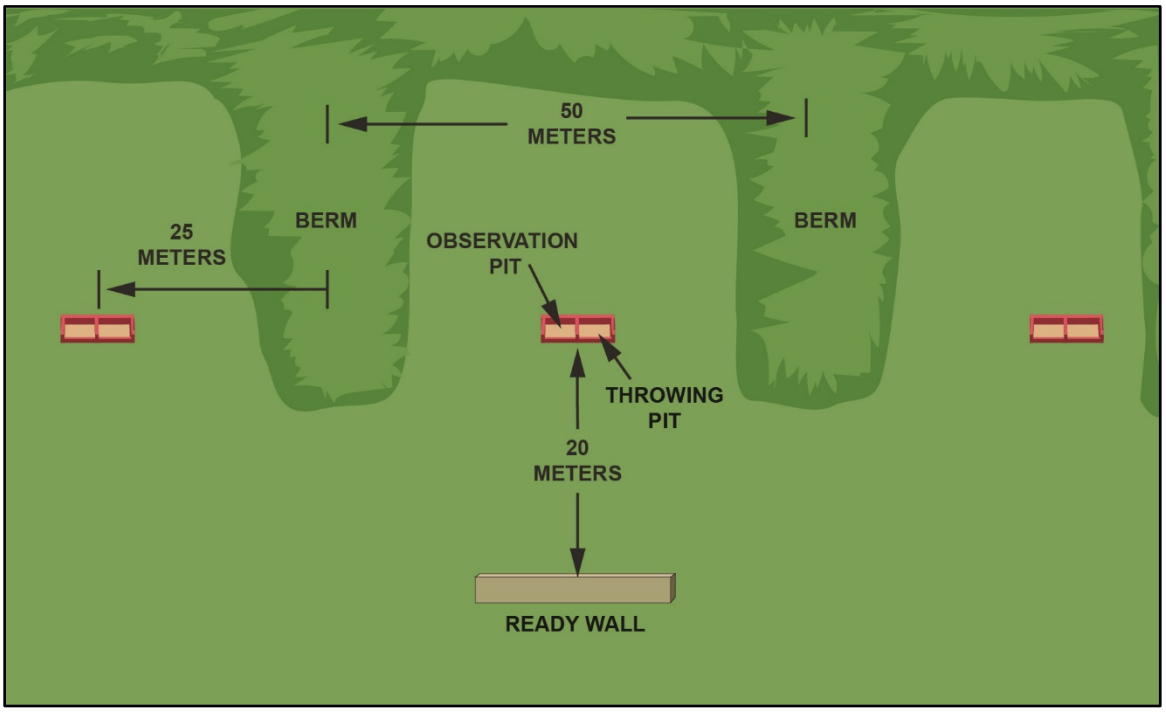

Figure D-7. Hand grenade range requirements

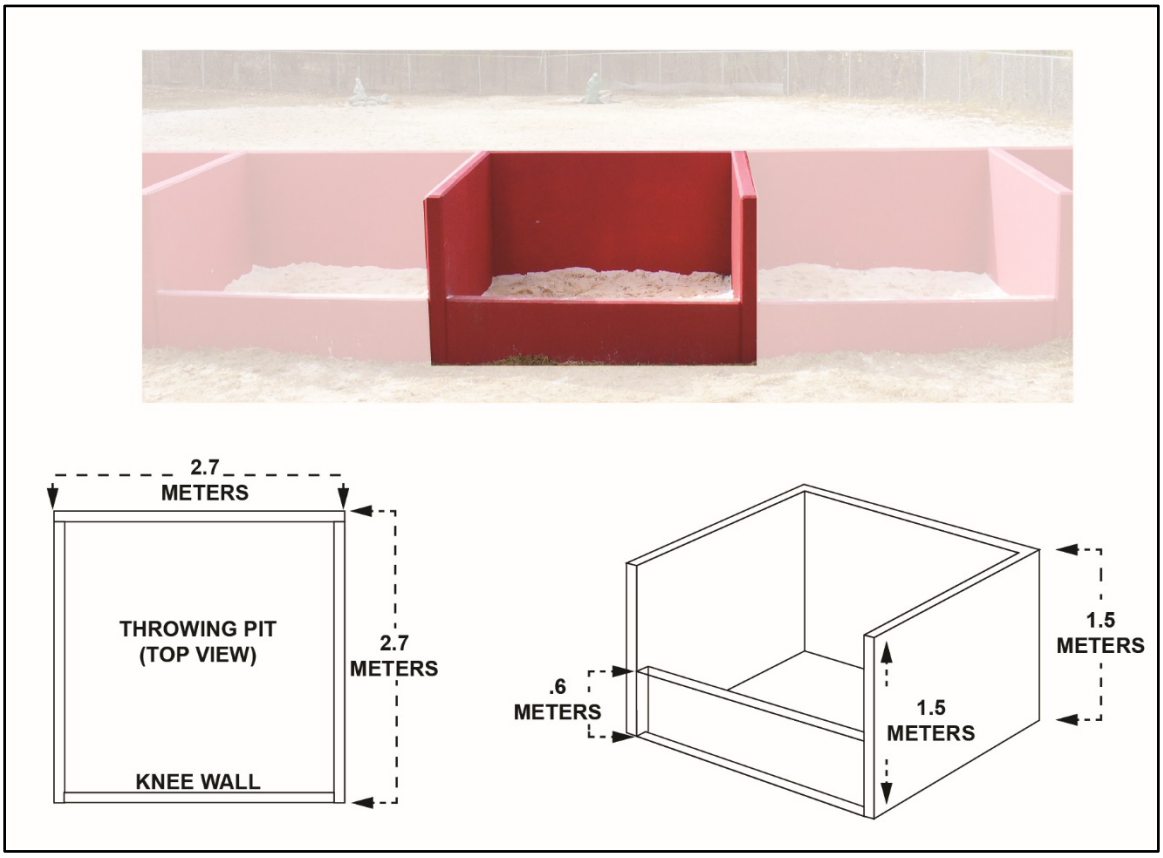

Figure D-8. Hand grenade live-bay layout

Observation Windows

D-74. If facilities permit, an observation window should be constructed to allow Soldiers to observe the live-bay throwing procedures before and after throwing hand grenades (see figure D-9). The observation window must be of the same construction used for observation pits and towers.

Figure D-9. Hand grenade live-bay layout, observation window

Hand Grenade Qualification Course

D-75. A seven-station layout is recommended. (See figures D-10 through D-17, pages D-18 through D-24.) These stations should enable Soldiers to perform the following tasks:

- Engage the enemy from a fighting position using an M69 at 35 meters (standing).
- Engage bunker using an M69 (prone).
- Engage enemy mortar position using an M69 at 25 meters (kneeling).
- Engage enemy behind cover using an M69 at 20 meters (prone).
- Engage trench using an M69 at 25 meters (standing).
- Engage wheeled vehicle using an M69 at 25 meters (kneeling).
- Identify hand grenades.

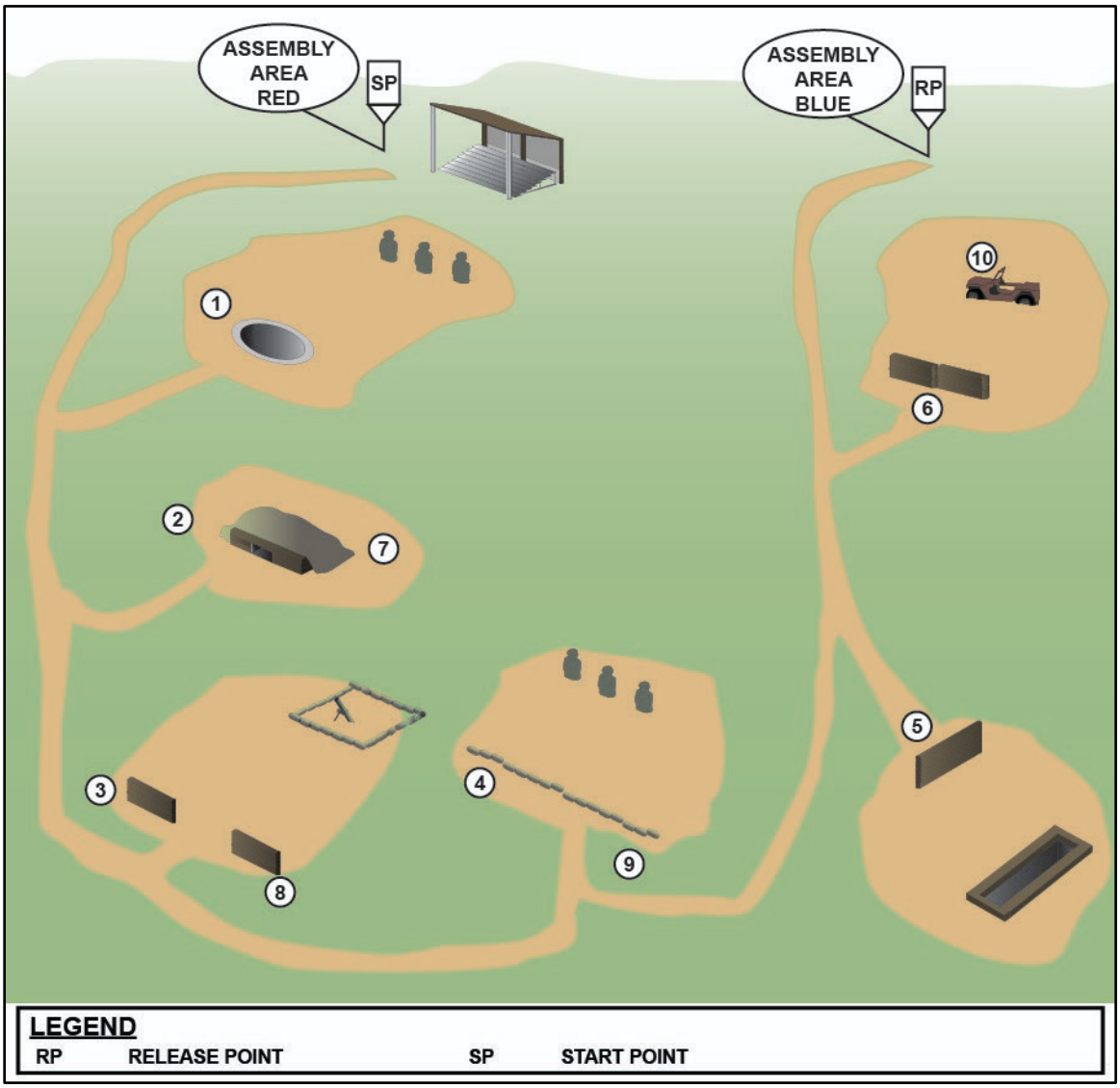

Figure D-10. Grenade qualification course

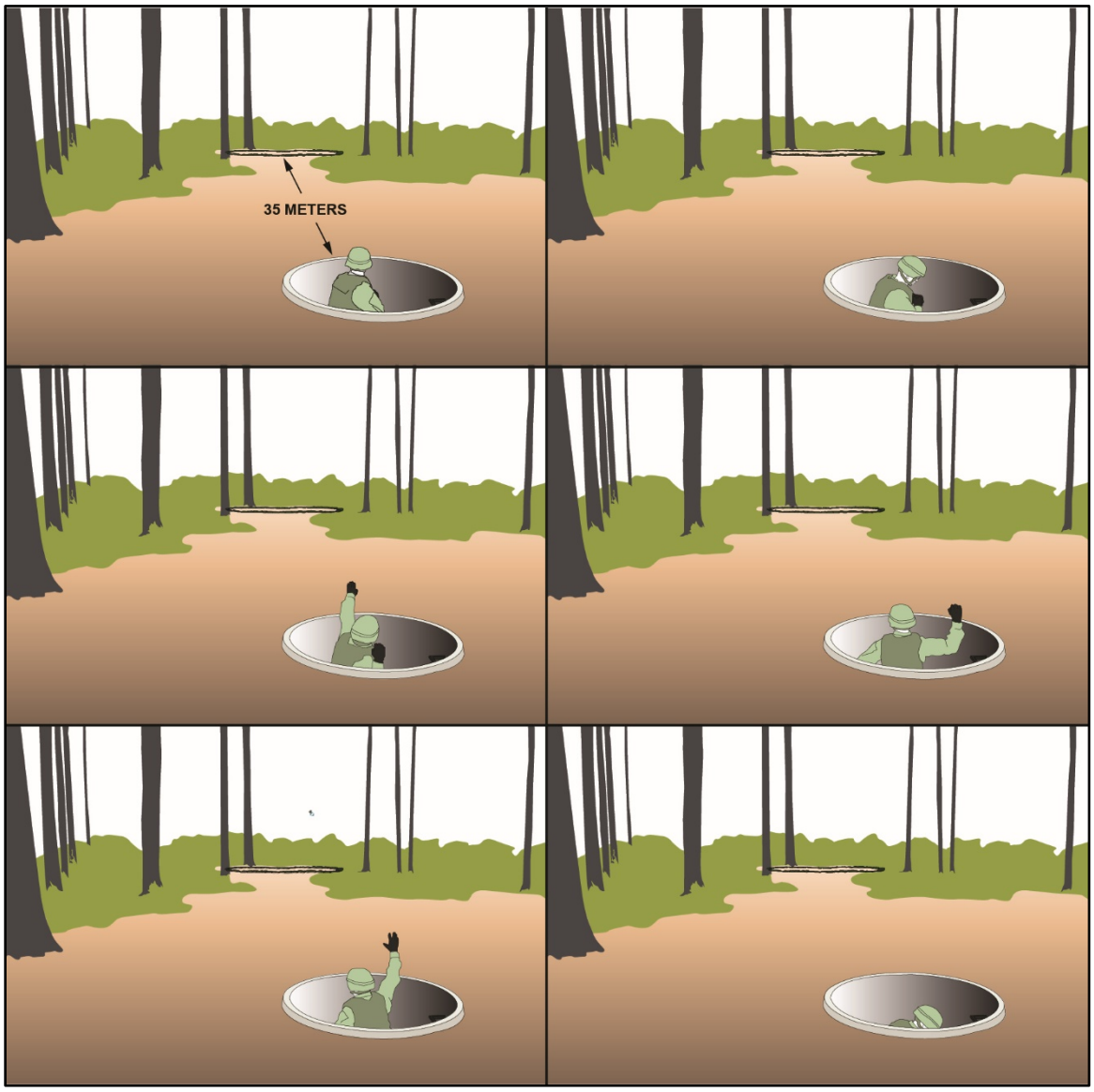

Figure D-11. Station 1, engage enemy from fighting position (standing)

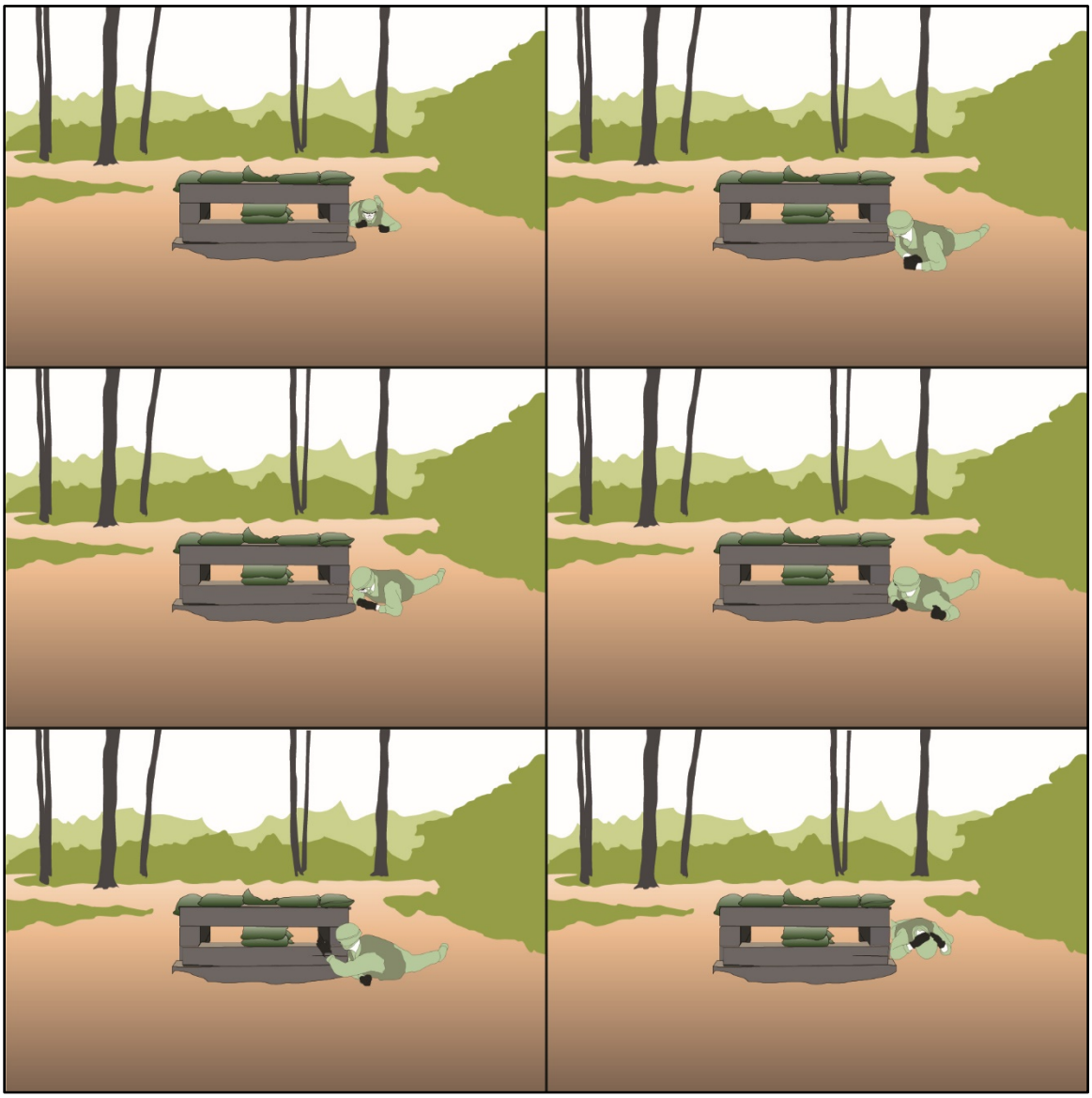

Figure D-12. Station 2, engage bunker (prone)

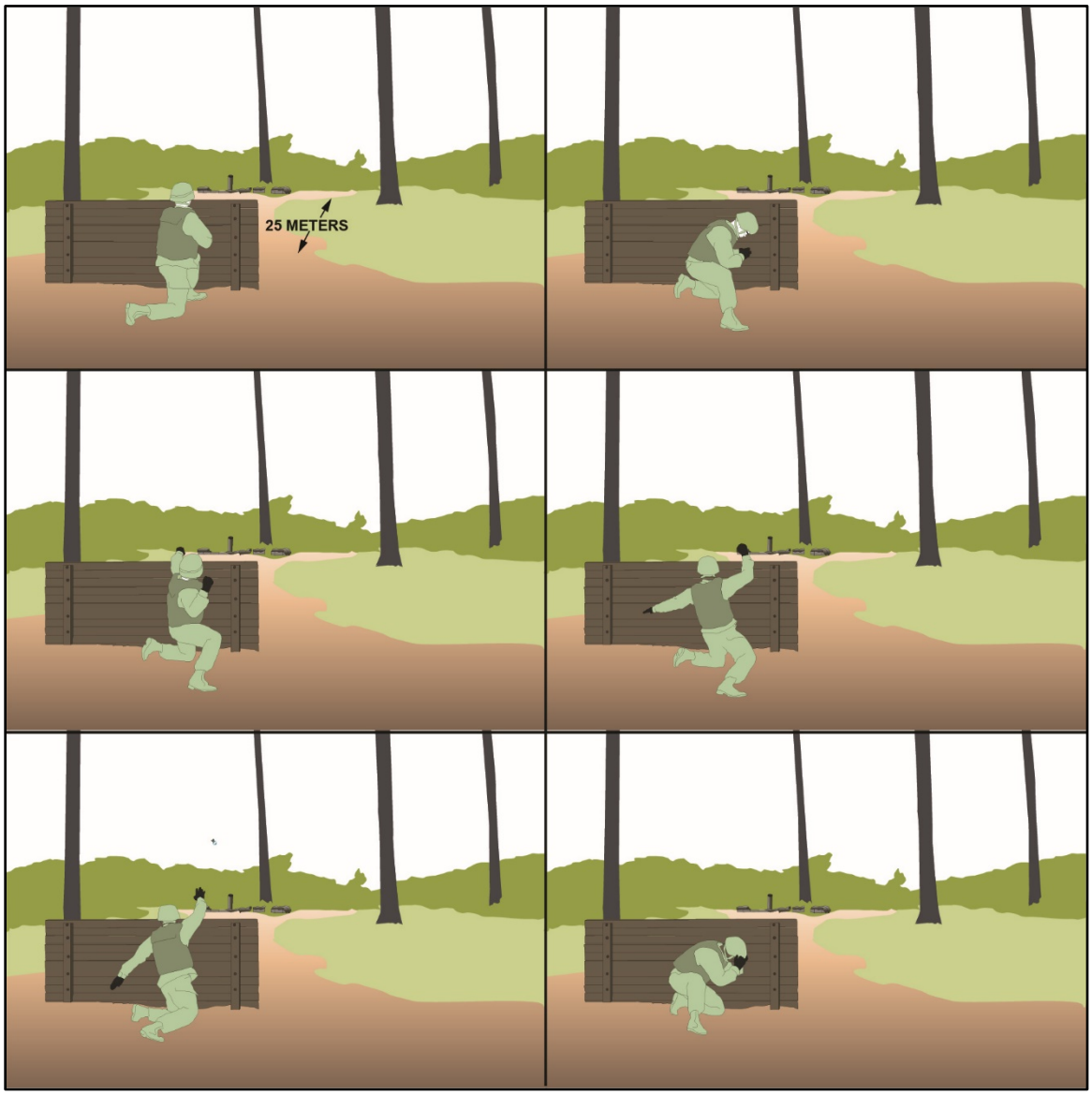

Figure D-13. Station 3, enemy mortar position (kneeling)

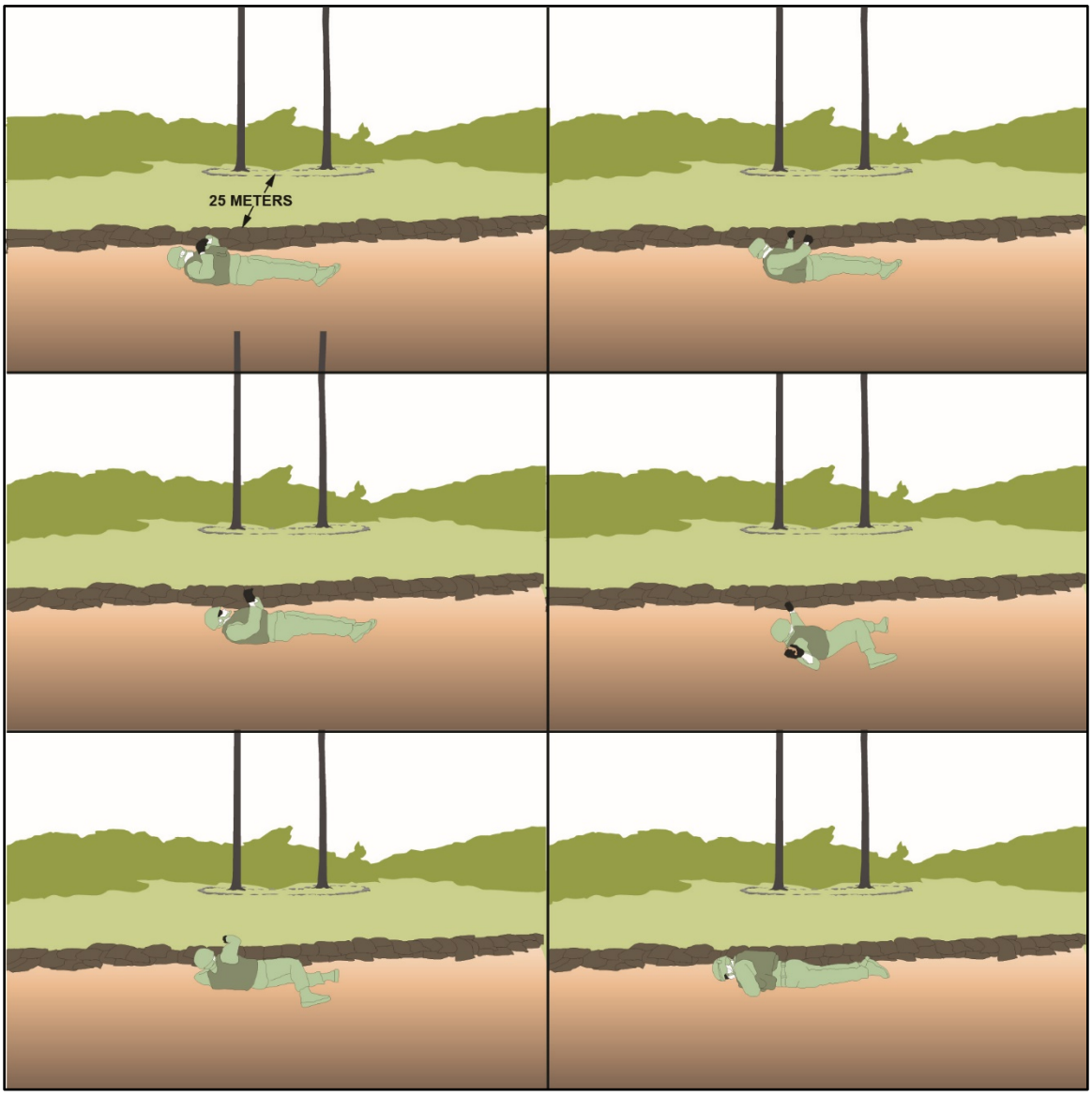

Figure D-14. Station 4, engage enemy from behind cover (alternate prone)

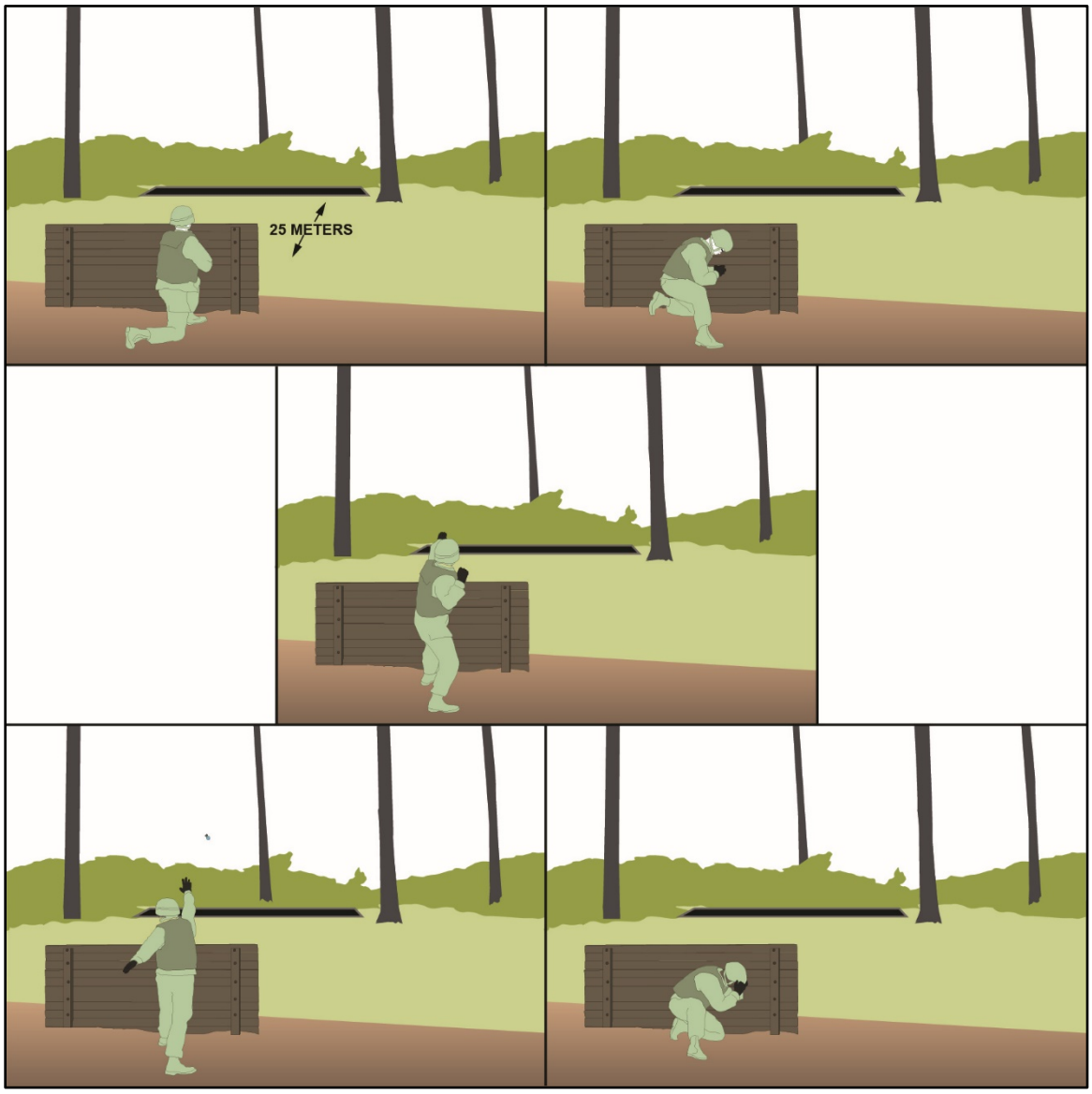

Figure D-15. Station 5, engage trench (standing)

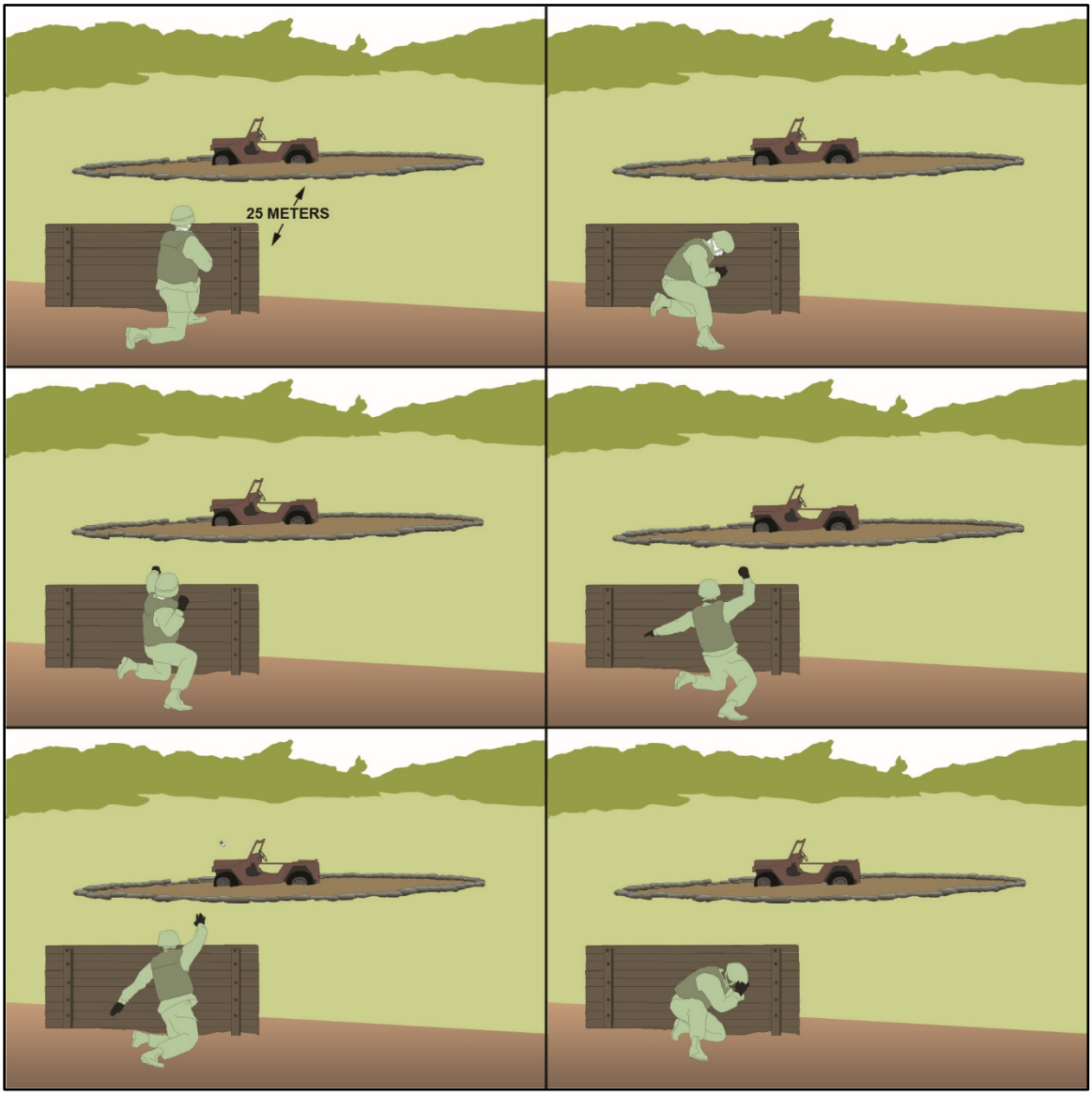

Figure D-16. Station 6, engage wheeled vehicle (kneeling)

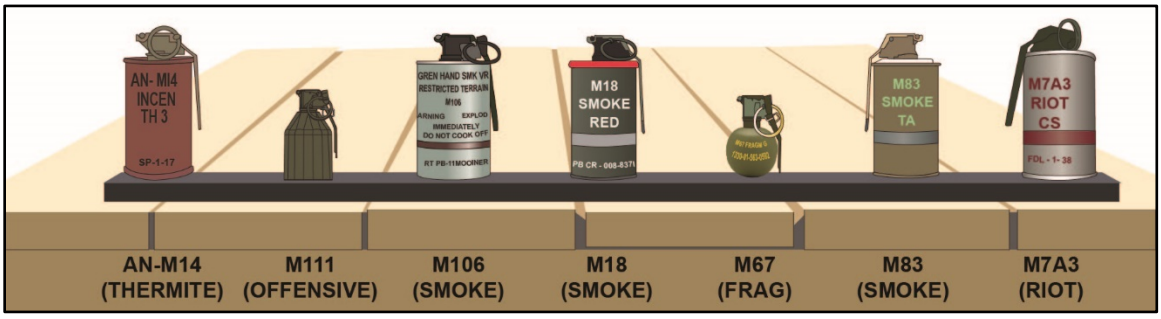

Figure D-17. Station 7, identify hand grenades

EQUIPMENT

D-76. The following is a minimum amount of range material and supplies needed to operate a practice and live hand grenade range:

- A helmet, a body armor vest, load-carrying equipment, eye protection, ear protection, and gloves for all range personnel and Soldiers attending training.
- Appropriate publications pertaining to training (for example, training circulars, field manuals, training manuals, Army regulations, and SOPs).
- Range flag.
- Communications equipment.
- Targets according to this training circular.
- Grenades (live or practice) and pyrotechnics, as needed.
- Training aids, as needed.

Note. Ensure that live (G881) M67 fragmentation hand grenades and (G878) M228 TPFs are fitted with or without the confidence clip.

- Medical support requirements:
  - Live-bay training minimum requirements are a certified medic and a field litter ambulance with dedicated driver.
  - Hand grenade qualification course minimum requirements are a certified combat lifesaver with a dedicated vehicle and driver.

Note. The driver must have knowledge of the route to the hospital.

- Potable water.
- DA Form 3517s (*Hand Grenade Qualification Scorecard*), according to this training circular.

SAFETY PERSONNEL

D-77. According to DA Pam 385-63, the following safety personnel are required for hand grenade training (see figure D-18, page D-26):

- OIC or NCOIC.
- RSO.

WEAPONS SYSTEMS	*PERSONNEL REQUIREMENTS*	
	OIC	RSO
Practice hand grenade, firing devices, simulators, or trip flares	SSG	SSG
Chemical agents and smoke[1]	SSG	NONE
Live grenades	SFC	SSG
LFXs, using organic weapons (squad through company, batter, and troop)	SFC	SSG
CALFEXs using outside fire support (section, platoon, squad, company, battery, troop, battalion, and squadron or larger)[2]	SFC	SSG
[1] When CBRN training is being conducted, the OIC or RSO must be CBRN-qualified. [2] The OIC will be a field-grade officer for battalion and larger-size units. The RSO on CALFEXs will be of the ranks listed above based on the complexity of the exercise and number of participants (such as squad, section, platoon, company, troop, squadron, battalion, and larger). ***Note***. Ranks or grades of other Services, DA Civilians, and contractors must be equivalent to U.S. Army ranks.		
Legend: CALFEX – combined arms live-fire exercise, CBRN – chemical, biological, radiological, and nuclear, DA – Department of the Army, LFX – live-fire exercise, OIC – officer in charge, RSO – range safety officer, SFC – sergeant first class, SSG – staff sergeant, U.S. – United States		

Figure D-18. Officer in charger or range safety officer requirements

Note. OICs and RSOs involved in serious range incidents may lose their certification if determined to be in violation of AR 385-63 or DA Pam 385-63. While an incident is under investigation, the installation commander may suspend their certifications for as long as deemed necessary or revoke them.

Officer in Charge and Noncommissioned Officer in Charge

D-78. The OIC or NCOIC is responsible for the overall conduct of the training, range orientation, range safety briefing, and briefing unit leaders. OICs must have satisfactorily completed a standard program of instruction in the duties of the OIC (developed by the unit to which they are assigned) and attended a range safety briefing conducted by the installation range operations. The OIC or NCOIC must—

- Be a sergeant first class or above (NCOIC only).
- Be knowledgeable in the weapon systems involved and the duties required.
- Be certified by the commander.
- Receive instruction by the installation range operations.
- Have current installation range safety cards. (See DA PAM 385-63.)

Note. Unit policies and regulations determine the rank of the OIC.

D-79. Once selected by the commander, OICs should select the right personnel to conduct the training, and then appoint an NCOIC who has current experience in the use of grenades and pyrotechnic signals. Together, the OIC and NCOIC should coordinate with adjacent units that are conducting or have conducted live grenade training for key personnel train-up and certification. The OIC and NCOIC should—

- Select and brief range support personnel on expected duties.
- Schedule for range certification with installation range operations. If currently certified, review installation range instructions.
- Certify selected range personnel on their range duties.

Note. Before conducting training, the OIC and NCOIC should review this training circular, AR 385-63, DA Pam 385-63, TM 9-1330- 200-12, TM 9-1370-206-10, and unit SOPs.

Range Safety Officer

D-80. The RSO should be the senior hand grenade instructor. RSOs must have satisfactorily completed a standard program of instruction in the duties of RSO (developed by the unit to which they are assigned) and attended a range safety briefing conducted by the installation range operations. The RSO must—

- Be a staff sergeant or above.
- Be knowledgeable in the weapon systems involved and the duties required.
- Ensure that the OIC has current installation range safety card. (See DA PAM 385-63.)
- Perform no duties other than those of safety officer.

Range Support Personnel

D-81. Safe and successful performance of training also requires experienced range support personnel. Support personnel required for training include—

- Pit safety NCOs. Pit safety NCOs provide instruction, prepare practice grenades, and conduct practice and live hand grenade training safety.
- Ammunition personnel. Ammunition personnel oversee accountability and handing out grenades.
- Tower operator. The tower operator controls Soldier movements during range operations and maintains communications with range operations.
- Guards, as required. Guards control traffic during range operations.
- Medical personnel. Medical support (with required medical supplies) must be present before and during range operations.
- Truck driver, if applicable. The truck driver transports personnel to and from the range and provides support as needed (for example, water, food, guard).

Note. The ammunition NCO must attend an ammunition handler's class provided by the local ASP.

Pit Safety Noncommissioned Officers

D-82. Range safety pit NCOs should possess the following qualifications—

- Be a sergeant or above.
- Be knowledgeable in the weapon systems involved and the duties required.
- Be selected and certified on all hand grenade and pyrotechnic tasks by the OIC and NCOIC.

Note. These personnel require no installation range safety card (see DA PAM 385-63) but must be task-certified by their unit on all grenade and pyrotechnic signals.

D-83. Pit safety NCOs also perform the five drop procedures in case of an emergency. These drop procedures are contingent on the following Soldier actions:

- Soldier milks the hand grenade.
- Soldier freezes after arming the hand grenade.
- Soldier remains standing after throwing the hand grenade downrange (attempting to observe the impact).
- Soldier drops the hand grenade.
- Soldier fails to take commands from the pit safety NCO.

Soldier Milks the Hand Grenade

D-84. Soldiers can milk the hand grenade in two ways; they can move their fingers or their thumb. When a Soldier milks the hand grenade by moving their fingers, pit safety NCOs performs the following procedures:

- Tell the Soldier to cease all action (FREEZE). Soldiers close their hand.

- Decide if the grenade is armed or safe.
- Tell the Soldier to THROW after determining the grenade is armed or unsafe.

D-85. When Soldiers milk the hand grenade by moving their thumbs, pit safety NCOs perform the following procedures:

- Tell the Soldiers to THROW.

Note. If the Soldier does not throw, perform the following actions.

- Place their thumbs across the Soldiers' thumb and their fingers across the Soldiers' fingers, securing the Soldiers' throwing hand (right hand for right-handed Soldiers, left hand for left-handed Soldiers).
- Use their free hand to force the Soldier to the front wall.
- Force the Soldier to drop the grenade over the front wall.
- Pull Soldiers into the pit and protect them from the blast.

Soldier Freezes After Arming the Hand Grenade

D-86. When a Soldier freezes after arming the hand grenade, pit safety NCOs perform the following procedures:

- Tell the Soldier to THROW.

Note. If the Soldier does not throw, the pit safety NCO performs the following actions.

- Place their thumb across the Soldiers' thumbs and their fingers across the Soldiers' fingers, securing the Soldiers' throwing hand (right hand for right-handed Soldiers, left hand for left-handed Soldiers).
- Use their free hand to force the Soldier to the front wall.
- Force the Soldier to drop the grenade over the front wall.
- Pull the Soldier into the pit and protect them from the blast.

Soldier Remains Standing After Throwing the Hand Grenade Downrange

D-87. Once pit safety NCOs see a hand grenade leave the throwing pit, they ensure that the Soldier is kneeling. If the Soldier continues to stand, the pit safety NCO physically forces the Soldier to kneel.

Soldier Drops the Hand Grenade

D-88. If the Soldier accidentally drops a live hand grenade after removing the safety pin, pit safety NCOs are responsible for reacting accordingly. They are responsible for the safety of the thrower and must decide what actions are the most appropriate. The pit safety NCO's actions are dependent upon the following factors:

- The location of the dropped grenade.
- The location of the thrower.
- The ability to physically move the thrower out of harm's way.

Note. All these factors need to be considered before the safety pin is pulled.

D-89. Often, a pit safety NCO's actions depend upon the location of the designated safe area (dependent on the presence or absence of a knee wall). Knee walls provide a fast and safe means of reacting to a dropped grenade. In most instances, the pit safety NCO reacts to a dropped live grenade using the following procedures:

- Yells GRENADE to alert all other personnel around the dropped grenade.
- Physically pushes the thrower over the knee wall.

- Falls on top of the thrower.

D-90. If a hand grenade is dropped over the knee wall, the pit safety NCO uses the following procedures:

- Yells GRENADE.
- Forces the thrower to the ground inside the throwing pit.

D-91. When using throwing pits that DO NOT have knee walls, the pit safety NCO reacts to a dropped live grenade using the following procedures:

- Yells GRENADE to alert other personnel in the area.
- Physically moves the thrower out of the throwing pit and into a safety pit.

D-92. If the hand grenade is dropped to the rear of the throwing pit, the pit safety NCO uses the following procedures:

- Yells GRENADE.
- Forces the thrower over the front of the throwing pit.
- Follows the thrower.

WARNING

In response to a dropped grenade, Soldiers must move immediately from the danger area and drop to the prone position with the advanced combat helmet facing the direction of the grenade. This reduces the Soldier's exposure. At no time should a Soldier attempt to recover, kick, or move a dropped grenade.

Soldier Fails to Take Commands

D-93. When a Soldier fails to take commands from the pit safety NCO, pit safety NCOs perform the following procedures:

- Repeat the command PREPARE TO THROW.

Note. If the Soldier does not attempt to arm the grenade, pit safety NCOs perform the following actions.

- Place their hand over the Soldiers' throwing hands (left hand for right-handed Soldiers, right hand for left-handed Soldiers), covering the fuze head.
- Place their other hand on the Soldiers' helmets and tells Soldiers to kneel in the throwing pit.
- Explain to Soldiers what they must do to throw the grenade downrange.

SURFACE DANGER ZONE

WARNING

Observe caution when using hand grenades or pyrotechnic signals with igniting type fuzes. These grenades and pyrotechnic signals ignite with a flash; Soldiers should throw them at least 10 meters from all friendly personnel to avoid hazardous conditions.

D-94. The surface danger zone (see figure D-19) should be clear of all nonessential personnel before conducting LFXs. The impact area should also be level and free of debris.

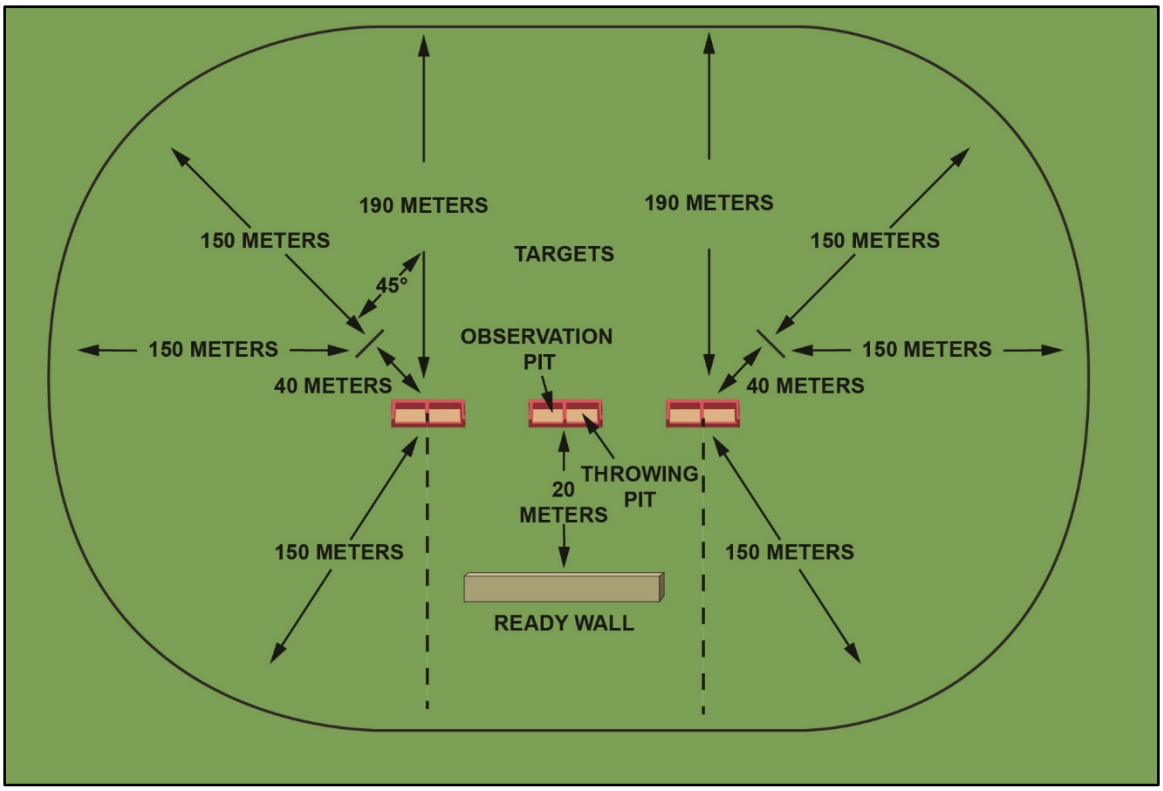

Figure D-19. Surface danger zone for live bays

DUDS

D-95. Soldiers should treat any thrown grenade that fails to detonate as a dud, regardless of safety pin, safety clip, or safety lever status. Duds must be regarded as dangerous. During training, the pit safety NCO determines a dropped grenade's status (see figure D-20).

STATUS	*DESCRIPTION*
SAFE	A grenade with all safety devices intact.
LIVE	A thrown grenade from the instant it is released until the expected fuze time has elapsed.
DUD	A thrown grenade that failed to detonate after the expected fuze time has elapsed.

Figure D-20. Status of dropped grenade

CAUTION

Soldiers should wear authorized Army Combat Glove System hand protection when refuzing practice grenades. The M228 practice fuze has a possibility of initiating during defuzing.

PRACTICE GRENADE

D-96. If a practice grenade does not detonate—

- Wait 5 minutes before defuzing the M69 TPG.
- Keep the bottom of the grenade oriented away from your body and pointed directly at the ground.
- Place the dud fuze in a sand-filled container and return it to the issuing facility or dispose of it according to the unit SOP.

FRAGMENTATION GRENADE

D-97. If a fragmentation grenade does not detonate in training—

- The thrower and pit safety NCO wait in the throwing pit for 5 minutes before returning to a covered area.
- The OIC or NCOIC notifies explosive ordnance disposal (EOD) immediately.

D-98. Until the dud is neutralized, Soldiers should not throw grenades in the area.

Note. If approved by range facilities, training may continue adjacent to the impact area that is separated by protective berms.

TRAINING CONDUCT

D-99. Training conduct involves the following five steps:

- Occupy, inspect, and set up the range.
- Prepare for training.
- Conduct the training.
- Complete the training mission.
- Sustain the training.

OCCUPY, INSPECT, AND SET UP RANGE

D-100. The OIC must establish communication with the installation range operations and request permission to occupy the range before personnel, materiel, or supplies arrive. Once this has been accomplished, the OIC and NCOIC should—

- Set up ammunition points and post guards.
- Establish locations for the medical station.
- Designate Soldier-holding areas.
- Establish water points.
- Designate parking areas.
- Inspect the range for operational conditions.
- Check all throwing pits for sharp edges or unleveled throwing surfaces.
- Ensure throwing pits meet standards.
- Check the tower and tower public address system, if applicable.
- Request an opening code from range operations, if applicable.
- Raise the range flag.

PREPARE FOR TRAINING

D-101. The OIC and NCOIC should greet unit leaders and Soldiers as they arrive and direct them to the holding area. Actions at the holding area include—

- Ensuring all Soldiers attending training have a helmet, a body armor, ear protection, and eye protection and gloves. Additionally, units may require the Soldier to wear their assigned load-bearing equipment and carry their assigned weapon.
- Identifying Soldiers to be trained.

CONDUCT THE TRAINING

D-102. The first step in conducting training is conducting a safety briefing, which includes briefings from administrative personnel (for example, range OIC or NCOIC, RSO, and medical personnel).

Note. The OIC should monitor all training activities.

D-103. The two types of training are initial training for introducing Soldiers to hand grenades and pyrotechnic signals and sustainment training of learned skills. The level of instruction dictates the length and pace of training.

Initial Training

D-104. Initial training involves the completion of the following five tasks:

- Participate in initial hand grenade training.
- Participate in distance and accuracy training.
- Participate in mock-bay training.
- Participate in live-bay training.
- Complete the hand grenade qualification course.

Participate in Initial Hand Grenade Training

D-105. The safety NCOs should take charge of the Soldiers and move them to the practice grenade training site. During the initial hand grenade training, the safety NCOs demonstrate the proper techniques for employing hand grenades. Training includes—

- Hand grenade safety, inspection, and maintenance procedures.
- Proper hand grenade storage on Soldier equipment.
- Proper hand grenade throwing grip (left/right-hand grips).
- Proper hand grenade safety-device removal.
- Proper hand grenade throwing positions and techniques.
- Demonstrations of pyrotechnic signals.

Participate in Distance and Accuracy Training

WARNING

DO NOT use live grenades for practicing distance and accuracy.

Note. During the practice events and for qualification, each Soldier must throw several M69 TPGs armed with the M228 TPF. Although it takes only about a minute or less to install or replace a used M228 TPF, a company-size element uses several hundred. Preparing practice grenades for all participants is not feasible. Therefore, units should give Soldiers instruction on installing and removing a fired M228 fuze. (See paragraphs 2-3 through 2-5 for information on M228 installation and removal.)

D-106. The distance and accuracy course is designed to develop the Soldier's proficiency in gripping and throwing hand grenades. When conducting the training, instructors should clarify the task, conditions, and standards for the course (see figure D-21) and demonstrate the task.

TASK	Engage a variety of targets at varying ranges up to 35 meters.
CONDITION	Given 10 practice grenades (with or without fuzes dependent on allocation), individual equipment, and a four-station course with a variety of targets at distances of 20, 25, and 35 meters.
STANDARD	The Soldier must successfully engage targets at each station with one out of two grenades. The Soldier must throw from the alternate prone, prone-to-kneeling, and prone-to-standing positions. A target is successfully engaged when the grenade detonates within 5 meters of the target.

Figure D-21. Distance and accuracy course task, condition, and standard

D-107. To develop good safety habits, supervisors and instructors must ensure Soldiers use proper throwing techniques.

Note. During the initial practical exercise, allow Soldiers to observe the strike of the grenade so they can gain an appreciation for the weight of the grenade and the amount of force to throw it accurately. After initial training, however, Soldiers should follow the proper procedures for seeking cover after throwing a grenade.

Participate in Mock-Bay Training

WARNING

DO NOT use live grenades for mock-bay training.

CAUTION

Mock-bay training is a mandatory event for all Soldiers before training with live hand grenades. Failure to conduct mock-bay training prevents identification of avoidable, dangerous errors with grenade employment procedures.

D-108. Mock-bay training enables Soldiers to learn the proper techniques of throwing a hand grenade before moving to a live bay where Soldiers experience realistic blast effects.

Note. Cadre or trainers use mock-bay training to identify Soldiers who require additional training and exhibit techniques that may be dangerous (to the Soldier and other personnel) in the live-bay environment.

D-109. For the safe and effective conduct of mock-bay training, Soldiers must—

- Wear body armor, ear protection, helmets, and eye protection.
- Receive a safety briefing before throwing training grenades.
- Carry the hand grenades to the throwing pits using proper right- or left-hand grips.
- Exhibit proper gripping procedures, arming procedures, throwing techniques, and throwing positions.
- Be properly supervised by a mock-bay safety NCO.

D-110. At the mock-bay, cadre or trainers must—

- Reinforce hand grenade safety.
- Explain live-bay conduct.
- Cover safety precautions.
- Discuss throwing order.
- Issue hand grenades.
- Use commands to prepare, throw, and take cover.
- Review throwing positions.

Note. Soldiers throw from the standing position during mock-bay and live-bay training.

- Take precautions in the event a Soldier drops a hand grenade after pulling the safety pin.

Note. The pit safety NCO is responsible for the safety of the thrower. The cadre or trainers demonstrate the techniques they use to protect the Soldier in the event a Soldier fails to take immediate cover behind the knee wall.

- Take precautions in the event a Soldier refuses to throw a live hand grenade.

Note. If a Soldier refuses to throw a live hand grenade while in the live-bay pit, pit safety NCOs direct the Soldier to remain behind cover and throw the grenade. Then they remove the Soldier from the remainder of training and give the Soldier's name to the chain of command.

D-111. Conduct training as follows:

- Issue each Soldier two M69 hand grenades with the M228 TPF for each rotation. The Soldiers install the M228 fuze before entering the mock bay.
- Rotate Soldiers twice through the mock bay.
- For the first rotation, observe Soldier actions and correct throwing deficiencies.

Note. DO NOT allow Soldiers to stand and observe a thrown hand grenade. Direct them to drop to a kneeling position behind cover after throwing the hand grenade.

- For the second rotation, ensure Soldiers are performing as taught and identify Soldiers who demonstrate weak or dangerous techniques. Identify Soldiers who fail to meet standards during the second rotation as high risk and send them back for reinforcement training.
- Conduct a third rotation upon completion of reinforcement training. Do not allow Soldiers who fail this retest to throw a live grenade.

Note. Tag Soldiers identified as high-risk with something that can be seen from a distance. These Soldiers should be placed at the end of the throwing order to ensure that training is not hindered and to minimize exposing other Soldiers to potential risks.

Participate in Live-Bay Training

Note. Soldiers going to the live bay must have first practiced all the procedures in the mock bay.

D-112. After inspecting all grenades, the NCOIC should take charge and move the Soldiers to the live-bay throwing site. Live-bay training gives Soldiers the opportunity to experience throwing a live fragmentation hand grenade.

D-113. Throwing of live hand grenades can be done in a safe manner if the range safety procedures are followed. These procedures include identifying high-risk Soldiers who had problems throwing grenades during the initial training block of instruction.

Note. Live-bay range personnel must be completely alert at all times and prepared to take appropriate actions for any given situation. Range OICs positions themselves to observe the throw phase and count grenade explosions for purposes of grenade accountability and duds.

D-114. For the safe conduct of live-bay training, Soldiers must—

- Complete mock-bay training before throwing live grenades.
- Wear body armor, ear protection, helmets, and eye protection.
- Receive a safety briefing before throwing live grenades.

- Carry the hand grenades to the throwing pits using proper right- or left-hand grips.
- Be properly supervised by RSO before moving to the throwing pit and by the pit safety NCO while at the throwing pit.
- Be behind protective barriers, where they stay until called forward.

CAUTION

All Soldiers, to include range personnel, and visitors to the range must be behind protective barriers and wear appropriate safety gear.

D-115. The OIC and NCOIC must take the appropriate safety precautions before conduct of live-bay training. This includes ensuring—

- All guards are posted, and roadblock barriers are in place before moving Soldiers to the live bay.
- Communication between roadblocks, the RSO, and the tower is confirmed before live throwing.
- Soldiers are shown the live-bay training area and a safety briefing is given on the operating procedures of the live bay.

Note. Range safety personnel must reinforce safety in the live bay. DO NOT cook off hand grenades. Brief Soldiers on the actions to take for a dropped grenade.

- Ensure the range is in a HOT status before beginning live-bay training.

D-116. During conduct of live-bay training—

- After the live-bay safety briefing, the RSO moves the Soldiers to the holding area and then lines them up in throwing order. The holding area must provide frontal and overhead cover or be positioned a safe distance behind the throwing line.
- The RSO then moves Soldiers forward to the ready line in groups that are equivalent to the number of throwing pits. On the ready line, the ammunition NCO gives the Soldiers instructions about which pits they move to and issues each Soldier two grenades, ensuring they hold them using proper right- and left-hand grip and at chin or chest level.
- When the tower says NEXT FIRING ORDER, MOVE OUT, the ammunition NCO tells the Soldiers on the ready line to move out.
- As the Soldiers move forward to the throwing pits, they sound off with their throwing hand (for example, RIGHT HAND or LEFT HAND). While they move, the pit safety NCOs verifies that the Soldiers are moving with their hands in the chin or chest working area and that they are maintaining proper grip on the grenades.
- When each Soldier gets to the throwing pit, the pit safety NCO has them move into the proper position in the pit, according to their throwing hand, and takes the grenade from their nonthrowing hand.
- When the tower operator gives the command PREPARE TO THROW, each pit safety NCO tells the Soldiers to prepare to throw, allowing them to remove the safety clip, disengage the pull ring from the confidence clip (if equipped), pull the safety pin, and assume a good throwing position. Pit safeties then hold up their right or left hand, signaling to the tower that the Soldiers are ready to throw.

Note. From this point on, pit safety NCOs do not divert their eyes from the throwing hand until completion of the throw.

- When all pit safeties have held up their right or left hand, indicating the Soldiers are ready to throw, the tower operator gives the command THROW. The pit safeties then tell the Soldiers to throw, while observing for proper technique. All Soldiers should throw at the same time.

WARNING

Soldiers throw their grenade and then take a knee behind cover.

D-117. Pit safety NCOs watch the thrown grenade to observe whether the safety lever separates from the fuze head. They then take cover next to the Soldier and ensure the Soldier remains down until the tower operator gives the command ALL CLEAR.

- When tower operators observe that all grenades have detonated, they announce ALL CLEAR. The pit NCO tells the Soldier to stand and hands the Soldier the second grenade. When the Soldier is ready, the pit safety NCOs signal the tower with their right or left hand up.
- When all pits are ready, the tower operator announces PREPARE TO THROW and the required steps above are repeated.
- After the second grenades have detonated, the tower operator announces ALL CLEAR, ALL CLEAR; NEXT FIRING ORDER, MOVE OUT. Then the Soldiers in the pits move back from the throwing line to behind cover and the next group of throwers move from the ready line forward to the throwing pits.

Complete the Hand Grenade Qualification Course

Note. DO NOT attempt this course until completion of all initial training.

D-118. The purpose of the qualification course is to measure and evaluate the Soldier's ability to engage a variety of targets in natural terrain under simulated combat conditions. The qualification course allows the Soldier to gain confidence in arming and throwing hand grenades in a simulated tactical scenario.

Stations

Note. Refer to the TRADOC Administrative Publications website for IET Soldier training requirements. Active-duty Soldiers in Infantry and reconnaissance units must qualify on the hand-grenade qualification course every six months according to DA Pam 350-38. All other active-duty Soldiers and those in Army Reserve and National Guard units must qualify according to the unit hand grenade training requirements in DA Pam 350-38, chapters 1 through 9.

D-119. The hand-grenade qualification course (see figures D-10 through D-17, pages D-18 through D-24) is standardized throughout the Army. It comprises seven stations (see figure D-22), with at least one grader at each station. Each participant receives 10 hand grenades and must successfully engage targets at six stations (with no more than 2 grenades used at any one station) and correctly identify hand grenades at the seventh station.

Note. See TC 25-8 for more information about the hand-grenade qualification course.

STATION	TASK	CONDITION	STANDARD
1	Engage a group of F-type silhouette targets in the open from a two-man fighting position.	The targets are located 35 meters to the front of the fighting position, simulating enemy movement through and beyond the squad's protective wire.	Soldier must throw grenade so it lands, or the fuze detonates, within 5 meters of enemy targets.
2	Engage a bunker using available cover and concealment.	The bunker can have one or two firing portholes oriented toward the direction of the buddy-team's movement and a rear exit.	Soldier must use proper technique to approach the bunker, cook off the grenade (2 seconds only), and employ the grenade inside the bunker.
3	Engage a fortified enemy mortar position.	The fortified enemy mortar position must be located 25 meters away.	Soldier must throw grenade so it lands inside the mortar position.
4	Engage a group of enemy targets.	The group of enemy targets must be behind cover and located 20 meters away.	Soldier must throw grenade so it lands, or the fuze detonates, within 5 meters of enemy targets.
5	Clear an entry point to a trench line.	The trench line must be located 25 meters away.	Soldier must throw grenade so it lands inside or rolls into the trench.
6	Engage enemy troops in a halted, open-type wheeled vehicle.	The halted, open-type wheeled vehicle must be located 25 meters away.	Soldier must throw grenade so it lands, or the fuze detonates, within 5 meters of the enemy vehicle.
7	Identify hand grenades.	All grenades must present proper shape, color, and markings.	Soldiers must identify grenades by type and purpose, using the shape, color, and markings, depicted by the training aid.

Figure D-22. Hand grenade qualification course stations

Note. Soldiers must successfully engage all targets with no more than two grenades to receive a GO. If the Soldier is successful with the first grenade, a second one is not thrown.

Scoring

D-120. Although no two hand-grenade qualification courses are alike, the standards must be consistent. Qualification must be awarded only to those Soldiers who meet these standards. Minimum course standards should include live-bay training and the hand-grenade qualification course.

Note. The evaluator at each station determines scoring according to DA Form 3517 shown in figures D-23 and D-24, page D-40. Units should maximize opportunities like the qualification course to place an emphasis on hand grenade familiarization training, based on unit Standards in Training Commission (known as STRAC) and mission requirements. There have been numerous reports of Soldiers being injured due to misidentifying or mishandling hand grenades. The hand grenade qualification is recommended to enhance Soldiers employment proficiency.

HAND GRENADE QUALIFICATION SCORECARD

For use of this form, see TC 3-23.30; the proponent agency is TRADOC.

NOTE: In addition to the requirements on the scorecard, the Soldier must throw two live fragmentation grenades to qualify.

A. NAME *(Last, First, Middle Initial)*	B. UNIT	C. DATE *(YYYYMMDD)*
Smith, Liam R.	A TRP, 1-7 CAV	20210806

D. LIVE GRENADE EVALUATOR'S NAME	E. DATE LIVE GRENADES WERE THROWN *(YYYYMMDD)*
SFC Brown, Ava D.	20210806

F. STATION	G. TYPE TARGET	H. GO	I. NO-GO	J. EVALUATOR'S INITIALS
1	Engage Enemy from Fighting Position at 35 Meters *(Standing)*	☒	☐	AB
2	Engage Bunker *(Prone)*	☒	☐	AB
3	Engage Enemy Mortar Position at 25 Meters *(Kneeling)*	☒	☐	AB
4	Engage Enemy Behind Cover at 20 Meters *(Prone)*	☒	☐	AB
5	Engage Trench at 25 Meters *(Standing)*	☒	☐	AB
6	Engage Wheeled Vehicle at 25 Meters *(Kneeling)*	☐	☒	AB
7	Identify Hand Grenades and Pyrotechnic Signals	☒	☐	AB

K. QUALIFICATION STANDARD		CHECK ONE
PASSED 7	EXPERT	☐
PASSED 6	FIRST CLASS	☒
PASSED 5	SECOND CLASS	☐
PASSED 4 OR LESS	UNQUALIFIED	☐

L. SCORER'S SIGNATURE	M. DATE *(YYYYMMDD)*
BROWN, AVA D. 1010101010 Digitally signed by BROWN, AVA D. 1010101010 Date: 2021.08.06 15:02:20 -04'00'	20210806
N. OIC'S SIGNATURE	**O. DATE *(YYYYMMDD)***
SANTIAGO, GARCIA.L 2020202020 Digitally signed by SANTIAGO, GARCIA.L 2020202020 Date: 2021.08.06 15:22:30 -04'00'	20210806

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SAMPLE

Figure D-23. Example of a completed DA Form 3517 (hand grenade qualification scorecard) (front)

PERFORMANCE MEASURES	GO	NO-GO
STATION 1. Engage Enemy From Fighting Position at 35 Meters *(Standing)*		
A. Detonated at least one grenade within 5 meters of the center of target.	☒	☐
B. Kept exposure time under 3 seconds.	☒	☐
C. Returned to covered position after each throw.	☒	☐
D. Used proper grip.	☒	☐
E. Used proper throwing techniques.	☒	☐
F. Completed performance measures 1A through 1E within 15 seconds.	☒	☐
STATION 2. Engage Bunker *(Prone)*		
A. Approached from blind side.	☒	☐
B. Checked for bunker opening.	☒	☐
C. Detonated grenade in bunker.	☒	☐
D. Rolled away from bunker.	☒	☐
E. Used proper grip.	☒	☐
F. Used cook-off technique.	☒	☐
G. Completed performance measures 2A through 2F within 15 seconds.	☒	☐
STATION 3. Engage Mortar Position at 25 Meters *(Kneeling)*		
A. Detonated at least one grenade inside mortar position.	☒	☐
B. Kept exposure time under 3 seconds.	☒	☐
C. Returned to covered position after each throw.	☒	☐
D. Used proper grip.	☒	☐
E. Used proper throwing techniques.	☒	☐
F. Completed performance measures 3A through 3E within 15 seconds.	☒	☐
STATION 4. Engage Enemy Behind Cover at 20 Meters *(Prone)*		
A. Detonated at least one grenade within 5 meters of the center of target.	☒	☐
B. Kept exposure time under 3 seconds.	☒	☐
C. Returned to covered position after each throw.	☒	☐
D. Used proper grip.	☒	☐
E. Used proper throwing techniques.	☒	☐
F. Completed performance measures 4A through 4E within 15 seconds.	☒	☐

PERFORMANCE MEASURES	GO	NO-GO
STATION 5. Engage Trench at 25 Meters *(Standing)*		
A. Detonated at least one grenade inside trench.	☒	☐
B. Kept exposure time under 3 seconds.	☒	☐
C. Returned to covered position after each throw.	☒	☐
D. Used proper grip.	☒	☐
E. Used proper throwing techniques.	☒	☐
F. Completed performance measures 5A through 5E within 15 seconds.	☐	☐
STATION 6. Engage Wheeled Vehicle at 25 Meters *(Kneeling)*		
A. Detonated within 1 meter of vehicle or within 5 meters of dismounting troops.	☐	☒
B. Kept exposure time under 3 seconds.	☒	☐
C. Returned to covered position after each throw.	☒	☐
D. Used proper grip.	☒	☐
E. Used proper throwing techniques.	☒	☐
F. Completed performance measures 6A through 6E within 15 seconds.	☒	☐
STATION 7. Identify Hand Grenades and Pyrotechnic Signals		
A. Selected fragmentation grenade to engage enemy soldiers.	☒	☐
B. Identified M83 grenade as "White Smoke" or "HC Smoke."	☒	☐
C. Identified M18 grenades as "Colored Smoke" or "Purple *(and so forth)* Smoke." *(If specific color is stated, it must be the same as color on the training aid grenade used.)*	☒	☐
D. Identified M7A2/A3 grenade as CS or riot control.	☒	☐
E. Identified M14 grenades as incendiary.	☒	☐

NOTES:

1. FOR PERFORMANCE MEASURES 7A THROUGH 7E, IF THE EXAMINEE CANNOT CORRECTLY STATE THE NAME OF THE GRENADE, BUT CAN CORRECTLY IDENTIFY ITS USE, THEN THE EXAMINEE WILL BE SCORED A "GO."

2. EACH PERFORMANCE MEASURE AT EACH SECTION IS GRADED ON A PASS/FAIL STANDARD. A SOLDIER MUST PASS ALL OF THE STANDARDS TO RECEIVE A "GO" ON THAT STATION.

SAMPLE

DA Form 3517, AUG 2021

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Figure D-24. Example of a completed DA Form 3517 (hand grenade qualification scorecard) (back)

Sustain the Training

D-121. Units should integrate the use of grenades into collective tasks, rather than training these skills as a separate event. Leaders at all levels should rehearse the employment of grenades with the unit mission and implement a training program that supports that mission.

D-122. Units should make a distinct effort to train beyond the hand-grenade qualification course. The following generic tasks can assist units in training and evaluating proficiency:

- Identify hand grenades and pyrotechnic signals.
- Inspect and maintain hand grenades and pyrotechnic signals.
- Employ a pyrotechnic signal.
- Complete the distance and accuracy course.
- Complete the bunker complex course.
- Complete the trench complex course.
- Complete the building complex course.
- Participate in mock-bay training.
- Participate in live-bay training.

Identify Hand Grenades and Pyrotechnic Signals

D-123. The purpose of this training is to develop, then test, the Soldier's knowledge in identifying and explaining the use of hand grenades and pyrotechnic signals, to include those not covered during the qualification course. When conducting the training, instructors should clarify the task, conditions, and standards (see figure D-25).

TASK	Identify a variety of hand grenades and pyrotechnic signals.
CONDITION	Given individual equipment and hand grenade or pyrotechnic mock-ups training aids or photos that reflect the proper shape, color, and markings for each grenade or pyrotechnic.
STANDARD	The Soldier must successfully identify each grenade or pyrotechnic by stating the correct type and purpose.

Figure D-25. Identify hand grenade and pyrotechnic signals – task, condition, and standard

Inspect and Maintain Hand Grenades and Pyrotechnic Signals

D-124. Soldiers inspect hand grenades and pyrotechnic signals on a regular basis to ensure serviceability due to prolonged exposure to environmental conditions, damage in shipping or in storage, or missing safety devices. Maintenance requirements are minimal (see figure D-26). (See TM 9-1330-200-12 and TM 9-1370-206-10 for more information on hand grenades and pyrotechnic signals.)

TASK	Perform PMCS of hand grenades and pyrotechnic signals.
CONDITION	Given individual protective equipment, a clean lint-free cloth, an oil-free camel hairbrush, cleaner, lubricant, and preservative, and an M67 or M111, or M69 or M112 hand grenade, a smoke signal, obscuration, CS, or incendiary grenade and a signal flare.
STANDARD	Soldiers must inspect, clean, and store M67 or M111 or M69 or M112 hand grenades, smoke, signal, obscuration, CS, incendiary, and pyrotechnic signaling devices without damaging the grenades or devices, or causing injuries to themselves or damaging unit equipment in accordance with TM 9-1330-200-12 and TM 9-1370-206-10.
Legend: CS – tear gas, PMCS – preventative maintenance checks and services; TM – technical manual	

Figure D-26. Inspect and maintain hand grenade and pyrotechnic signals – task, condition, and standard

Employ a Pyrotechnic Signal

D-125. To successfully employ pyrotechnic signals, Soldiers must (see figure D-27)—

- Be familiar with the type of pyrotechnic signal used.
- Know how to properly hold, prepare, and throw or launch the pyrotechnic signal from various positions.

TASK	Employ a pyrotechnic signal.
CONDITION	Given individual protective equipment, an M106, M83, and M18 smoke grenade, a handheld flare, and a 20-meter target.
STANDARD	The Soldier must provide a complete smoke screen that cannot be observed from the target area and successfully launch a handheld flare (by hand or from the ground) to communicate withdrawal or shifting of friendly fires.

Figure D-27. Employ a pyrotechnic signal – task, condition, and standard

Complete the Bunker Complex Course

WARNING

When using the M106 SOD-Vr, do not "cook off" or "milk" the grenade. This smoke grenade has a normal fuze delay of 1.0 to 2.3 seconds. Failure to maintain a proper grip and pressure on the safety lever after safety pin extraction and throughout the employment process may result in personal injury to the face, eyes, or hands, or damage to unit equipment.

WARNING

DO NOT use live grenades for practicing the bunker complex course.

D-126. The bunker complex course exercise develops the Soldier's proficiency in properly attacking a bunker complex from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (see figure D-28) and demonstrate the task. (See paragraphs 3-33 and 3-34 for the proper "cook off" technique.)

TASK	Engage an enemy bunker complex.
CONDITION	Given an individual weapon, helmet, load-bearing equipment and body armor, cover and concealment, and two M69 hand grenades with M228 TPF, or M111 offensive (concussion) grenades, or M84 stun grenades (flashbang), and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully engage and disable a bunker. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the bunker from the blind side, properly "cook off" an M69 or M112 TPG with M228 TPF for 2 seconds (one thousand one, one thousand two), put the grenade into the firing port of the bunker, roll away from the bunker, and turn 180 degrees to cover the rear exit of the bunker. The grenade must detonate in the bunker.
Legend: TPF – training practice fuze	

Figure D-28. Bunker complex course – task, condition, and standard

Complete the Trench Complex Course

WARNING

Never attempt to hold onto any type of smoke grenade to allow the smoke to form before employment.

Do not attempt to "cook off" or "milk" any of the following type of hand grenades; M18 series, AN-M8 HC, M83 TA, M106 SOD-Vr, M14, M7A2 or M7A3, M84 nonlethal or M104 nonlethal, or any other grenade that has a fuze delay less than 4.0 seconds. (See figure 3-51 on page 3-63 for more information.)

WARNING

DO NOT use live grenades for practicing the trench complex course.

D-127. The trench complex course exercise develops the Soldier's proficiency in properly attacking a trench complex from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (see figure D-29) and demonstrate the task.

TASK	Engage an enemy trench complex.
CONDITION	Given an individual weapon, helmet, load-bearing equipment and body armor, cover and concealment, and two M69 or M112 practice hand grenades with M228 TPF and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully enter a trench and engage enemy personnel. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the trench and properly "cook off" an M69 or M112 practice grenade with M228 TPF for 2 seconds (one thousand one, one thousand two), throw or roll the grenade into the trench, roll away from the mouth of the trench, wait for the explosion, and enter and clear the trench. The grenade must detonate in the trench.
Legend: TPF – training practice fuze	

Figure D-29. Trench complex course – task, condition, and standard

Complete the Building Complex Course

D-128. The building complex course exercise develops the Soldier's proficiency on how to properly attack and clear a building from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (see figure D-30) and demonstrate the task.

WARNINGS

Never attempt to hold onto any type of smoke grenade to allow the smoke to form before employment.

Do not attempt to "cook off" or "milk" any of the following type of hand grenades; M18 series, AN-M8 HC, M83 TA, M106 SOD-Vr, M14, M7A2/A3, M84 nonlethal or M104 nonlethal, or any other grenade that has a fuze delay less than 4.0 seconds. Refer to table 3-1, grenade fuze delay setting on page 3-62 for more information.

DO NOT use M18, M83, or AN-M8 smoke grenades in enclosed or confined spaces. Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen.

CAUTION

M18 and M83 smoke grenades can start fires when thrown on dry tender.

TASK	Enter and clear a building complex.
CONDITION	As a member of a clearing team. Given an individual weapon, helmet, load-bearing equipment and body armor, cover and concealment, and two M69 or M112 hand grenades with M228 TPF, or nonlethal M84 stun grenades (flashbang), and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully enter a building and engage enemy personnel. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the building from a covered and concealed position, properly prepare and "cook off" an M69 or M112 grenade with M227 TPF (one thousand one, one thousand two). Do not "cook" off the M84 nonlethal flashbang stun grenade; it has a 1.0- to 2.3-seconds fuze delay. Throw the grenade into a designated building entry point, take cover, wait for the explosion, and enter and clear the entry point. The grenade must detonate in the building/room.
Legend: TPF – training practice fuze	

Figure D-30. Building complex course – task, condition, and standard

Participate in Mock-Bay Training

WARNING

DO NOT use live grenades for mock-bay training.

D-129. In mock-bay training, Soldiers practice throwing grenades before moving to live-bay training. This training introduces the Soldier to throwing commands and provides additional throwing practice. Instructors should orient the Soldiers to the mock-bay training pit and explain the commands used during actual throwing.

D-130. When conducting the training, instructors should clarify the task, conditions, and standards for the training (see figure D-31) and demonstrate the task. Soldiers should also practice the procedures used during live-bay training.

Note. The instructor must reinforce correct throwing and safety procedures.

TASK	Engage targets in the open with hand grenades.
CONDITION	As a member of a clearing team. Given an individual weapon, helmet, load-bearing equipment and body armor, cover and concealment, and two M69 or M112 practice hand grenades with M228 TPF, or M84 nonlethal stun grenades (flashbang), and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully enter a building and engage enemy personnel. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the building from a covered and concealed position, properly prepare the M69 or M112 practice grenade with M228 TPF for 2 seconds "cook off" (one thousand one, one thousand two). Throw the grenade into a designated building entry point, take cover, wait for the explosion, and enter and clear the entry point. The grenade must detonate in the building/room. **Note**: If the M84 nonlethal stun (flashbang) hand grenade is used for this task, the 2 seconds "cook off" will not be performed due to the 1.0- to 2.3-second fuze delay of the M84 stun grenade. Throw the grenade into a designated building entry point, take cover, wait for the explosion, and enter and clear the entry point.
Legend: TPF – training practice fuze	

Figure D-31. Mock-bay training – task, condition, and standard

Note. Be sure the physical layout of the mock-bay pit replicates the live-bay pit. This not only gives Soldiers the sensation of throwing a live fragmentation hand grenade but also instills confidence in their ability to throw the hand grenade.

Participate in Live-Bay Training

Note. Soldiers going to the live bay must have first practiced all the procedures in the mock bay.

D-131. After inspecting all grenades, the NCOIC takes charge and move the Soldiers to the live-bay throwing site. Live-bay training gives Soldiers the opportunity to experience throwing a live fragmentation hand grenade (see figure D-32).

TASK	Engage targets in the open with hand grenades.
CONDITION	Given individual equipment, to include helmet, body armor, and two M67 fragmentation hand grenades, or one M67 fragmentation and one M111 offensive hand grenade, a live-bay pit, ear protection, and an orientation and safety briefing.
STANDARD	Soldiers must safely carry, arm, and throw two M67 fragmentation hand grenades, or one M67 fragmentation and one M111 offensive hand grenade from the live-bay pit while following the commands from the instructor or NCOIC. Soldiers must not move from the cover of the pit until the command ALL CLEAR, ALL CLEAR is given.
Note. For more information about live-bay training, see paragraphs D-109 through D-114.	
Legend: NCOIC – noncommissioned officer in charge	

Figure D-32. Live-bay training – task, condition, and standard

Collective Training

Note. Soldiers should use the M69 and M112 practice hand grenades with M228 TPF against realistic targets while practicing the collective tasks. Use the M112 offensive grenade with M228 TPF during urban operations. (Use the M102 nonlethal training grenade with M240 TPF to simulate the M84 nonlethal stun grenade if required.).

D-132. To fulfill collective training tasks, leaders should present Soldiers with tactical situations in a realistic squad STX, integrating the use of hand grenades and pyrotechnics with other fire team or squad weapons to force Soldiers to make sound tactical decisions and improve their skills.

D-133. Leaders should consider integrating hand grenade tasks that are best suited to the unit's METL into the tactical scenario. Using squad STX, leaders can evaluate and test the squad's proficiency in an STX.

COMPLETE THE TRAINING MISSION

D-134. At the completion of training, account for all equipment, range material, and ammunition, to include the completion of range maintenance. The OIC and RSO can close the range. This includes—

- Requesting a closing code from range operations.
- Range or unit cadre conducting physical equipment and personnel check for live, dud, or ammunition residue.
- Releasing unit Soldiers.
- Removing all equipment and ammunition from the range.

Note. Turn in all unexpended grenades in original grenade individual container and wooden box to the ASP, along with all safety levers and safety pull rings or pins that can be found safely within the impact training area and packing residue from all detonated grenades.

- Have EOD find and clear any duds and grenades thrown with the safety pin pulled.
- Police the range, fill in all holes with sand, rake the impact area, and perform other range maintenance when necessary by local SOP.
- Request a range inspection from range operations when ready to clear.
- Turn in paperwork and equipment.
- Submit after-action report to headquarters.
- Report any noted safety hazards to proper authorities.

Glossary

The glossary lists acronyms and terms with Army or joint definitions. Where Army and joint definitions differ, (Army) precedes the definition. Terms for which TC 3-23.30 is the proponent are marked with an asterisk. The proponent manual for other terms is listed in parentheses after the definition. .

SECTION I – ACRONYMS AND ABBREVIATIONS

ADP	Army doctrine publication
ADRP	Army doctrine reference publication
AGL	above ground level
ASP	ammunition supply point
ATP	Army techniques publication
ATTP	Army tactics, techniques and procedures
CBRN	chemical, biological, radiological, and nuclear
CRM	collection requirements management
CS	tear gas
CSF2	Comprehensive Soldier and Family Fitness
DA	Department of the Army
DESR	Defense Explosives Safety Regulation
DOD	Department of Defense
DODAC	Department of Defense ammunition code
DODIC	Department of Defense identification code
EOD	explosive ordnance disposal
FM	field manual
FSC	Federal Supply Classification
GTA	graphic training aid
HC	hexachlorethane-zinc (burning-type white smoke compound)
IET	initial entry training
JP	Joint Publication
LFX	live-fire exercise
MCO	Marine Corps order
MCTP	Marine Corps tactical publication
METL	mission-essential task list
METT-TC	mission, enemy, terrain and weather, troops and support available, time available, and civil considerations
MIL-STD	military standard
mm	millimeter
NCO	noncommissioned officer

NCOIC	noncommissioned officer in charge
NLBHG	nonlethal bursting hand grenade
NSN	national stock number
NVG	night vision goggle or goggles
OHG	offensive hand grenade
OIC	officer in charge
POHG	practice offensive hand grenade
PPE	personal protective equipment
ROE	rules of engagement
RSO	range safety officer
SB	supply bulletin
S-4	battalion or brigade logistics staff officer
SB	supply bulletin
SOD-Vr	screening obscuration device – visual restricted terrain
SOP	standard operating procedure
STRAC	Standards in Training Commission
STP	Soldier training publication
STX	situational training exercise
TA	terephthalic acid
TC	training circular
TH3	thermate
TM	technical manual
TNT	trinitrotoluene
TPF	training practice fuze
TPG	training practice grenade
U.S.	United States

SECTION II – TERMS

munition

A complete device charged with explosives, propellants, pyrotechnics, initiating composition or chemical, biological, radiological or nuclear material, for use in operations, including demolitions. (FM 4-30)

ordnance

Explosives, chemicals, pyrotechnics, and similar stores, e.g., bombs, guns and ammunition, flares, smoke, or napalm. (JP 3-15)

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REQUIRED PUBLICATIONS

These documents must be available to the intended users of this publication.

DOD Dictionary of Military and Associated Terms. January 2021.

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RELATED PUBLICATIONS

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Comprehensive Soldier and Family Fitness: https://ready.army.mil/ra_csf.htm.

Defense Ammunition Center and the U.S. Army Technical Center for Explosive Safety: https://goordnance.army.mil/dac/dac.html.

TRADOC Administrative Publications: https://adminpubs.tradoc.army.mil/index.html.

PRESCRIBED FORMS

Unless otherwise indicated, DA Forms are available on the Army Publishing Directorate (APD) website: https://armypubs.army.mil/.

DA Form 3517. *Hand Grenade Qualification Scorecard.*

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Unless otherwise indicated, DA forms are available on the Army Publishing Directorate (APD) website: https://armypubs.army.mil/.

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DA Form 3151-R. *Ammunition Stores Slip*.

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TC 3-23.30
17 August 2021

By Order of the Secretary of the Army:

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